

EXHIBIT 34

1 UNITED STATES DISTRICT COURT
2 FOR THE
3 DISTRICT OF VERMONT
4

5 JAMES D. SULLIVAN, LESLIE ADDISON,
6 SHARYN JONES and BISHOP ROBIN HOOD
7 GREENE, individually, and on behalf of
8 a Class of persons similarly situated,
9 Plaintiffs,

10 -vs-

5:16-cv-00125

11 SAINT-GOBAIN PERFORMANCE PLASTICS CORPORATION,
12 Defendant.
13

14 VIDEOTAPED DEPOSITION OF
15 PHILIP K. HOPKE, Ph.D.
16 April 3, 2018
17
18

19 Reported by: Pamela Palomeque, RPR, CRR, NYRCR
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Videotaped Deposition of
PHILIP K. HOPKE, Ph.D, held at the offices
of FARACI LANGE, LLP, Rochester, New York,
on April 3, 2018, before PAMELA PALOMEQUE,
NYRCR, RPR, CRR, and Notary Public in and
for the State of New York.

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1 (8:47 a.m.)

2 THE VIDEOGRAPHER: Good morning, we are
3 on the record. The time is approximately
4 8:47 a.m. on Tuesday, April 3rd, 2018.
5 Please note the microphones are sensitive and
6 will pick up whispering and private
7 conversations. Please silence or turn off
8 all cell phones. Audio and video recording
9 will take place unless all parties agree to
10 go off the record.

11 This is media unit 1 of the video
12 recorded deposition of Philip K. Hopke, Ph.D.
13 taken by the defense in the matter of
14 James D. Sullivan, et al., individually and
15 on behalf of a class of persons similarly
16 situated, Plaintiffs versus Saint-Gobain
17 Performance Plastics Corporation, Defendants.
18 Civil action number 5:1-C-CV-00125. The case
19 is filed in the United States District Court,
20 district of Vermont.

21 The deposition is being held at the law
22 offices of Faraci & Lange, 28 East Main
23 street, Rochester, New York. I am Ken
24 Williamson, the videographer for Veritext.
25 Our Court Reporter is Pamela Palomeque also

1 for Veritext.

2 I am not authorized to administer the
3 oath. And I am not related to any party in
4 this action nor am I financially interested
5 in the outcome. Counsel and all present in
6 the room and everyone attending, please state
7 your appearances and affiliations for the
8 record.

9 MR. FLEMING: Sure. Doug Fleming for
10 the Defendant Saint-Gobain Performance
11 Plastics.

12 MR. LoCASTRO: Nicholas LoCastro for the
13 Defendant Saint-Gobain.

14 MR. CHINKIN: Lyle Chinkin for the
15 Defendant.

16 MR. DAVIS: Gary Davis for the Sullivan
17 Plaintiffs in a class.

18 DR. HOPKE: Philip Hopke for Sullivan
19 Plaintiffs.

20 THE VIDEOGRAPHER: Please swear our
21 witness.

1 P H I L I P K. H O P K E, Ph.D., having been
2 called as a witness, being duly sworn by the notary
3 public present, testified as follows:

4 EXAMINATION BY MR. FLEMING:

5 Q. Good morning. Could you just state your full
6 name for the record?

7 A. Philip Karl Hopke.

8 Q. And again, I'm Doug Fleming; I represent the
9 Defendant, Saint-Gobain Performance Plastics, and I'll
10 be taking your deposition today.

11 A. Okay.

12 Q. We haven't met before right; we just met this
13 morning before the deposition a few minutes ago. Have
14 you ever been deposed before, Dr. Hopke?

15 A. No, I have not.

16 Q. Okay. So I'm sure your attorney has
17 discussed it with you but maybe I can discuss a few
18 basic sort of ground rules. You understand this is an
19 opportunity for the Defendant to ask you about your
20 opinions that you intend to offer in this case?

21 A. Yes.

22 Q. If there are any questions that I ask you
23 today that you don't understand, would you let me know
24 that?

25 A. Sure.

1 Q. If you don't let us know that, we're going to
2 assume you understood the question. Is that fair?

3 A. Absolutely.

4 Q. I'll do my best and you can do your best but
5 we should try not to speak over each other.

6 A. Mm-hmm.

7 Q. So I'll try to wait until you finish and
8 answer before asking the next question and try to let me
9 finish my questions before you answer.

10 A. Okay.

11 Q. If we're both talking at the same time, it's
12 hard for the Court Reporter to take it down.

13 A. Right, and probably both of us to understand
14 each other.

15 Q. Excellent point. In addition to that, try to
16 answer audibly. We do have a videotape here but it will
17 hard for the Court Reporter to get down if you shake
18 your head yes or no. If you audibly say "yes" or "no"
19 if you mean yes or no.

20 A. Yep.

21 Q. Ah-ha and uh-uh is hard.

22 A. Yes and no is the appropriate responses.

23 Q. Very good. Is there any -- are you taking
24 any medication today that would impair your ability to
25 testify to the best of your ability?

1 A. No. Takes lots of medications; I'm an old
2 guy.

3 Q. But nothing --

4 A. Nothing that's going to affect it.

5 Q. Is there any reason, as you sit here today,
6 you can't testify truthfully and accurately to the best
7 of your ability?

8 A. No.

9 Q. Dr. Hopke, I'm going to hand you a document
10 that we're going to mark as Exhibit 1 and it's your
11 Class Certification Expert Report in this case.

12 (Hopke Exhibit 1, 9/1/17 Class
13 Certification Expert Report, marked for
14 identification, this date.)

15 Q. So Dr. Hopke, this is a report with
16 TRM Environmental Consultants on the cover with your
17 signature, right?

18 A. Yes, it is.

19 Q. It's dated September 1st, 2007 (sic)?

20 A. Yes, it is.

21 Q. It's your Class Certification Report?

22 A. Mm-hmm, yes, it is.

23 Q. I would like to mark Exhibit 2.

24 (Hopke Exhibit 2, 10/2/17 Declaration of
25 Philip K. Hopke, Ph.D., marked for

1 identification, this date.)

2 Q. And Dr. Hopke, this is a Declaration of
3 Philip K. Hopke, Ph.D. signed by you with a filed date
4 of October 2nd, 2017. Right?

5 A. Yes.

6 Q. And was this a Declaration that you offered
7 in support of class certification?

8 A. Yes.

9 Q. If you could take a look at your Declaration
10 there, Dr. Hopke, at the first page, about the fifth
11 line down, it says, "I have prepared an expert report
12 attached as Exhibit 1." Is that the Exhibit 1 that we
13 just discussed to this deposition?

14 A. Yes.

15 Q. "And it contains a complete statement of all
16 opinions I will express on the issue of class
17 certification and the basis and reasons for them as well
18 as the facts or data I considered in forming these
19 opinions." Do you see that?

20 A. Yes.

21 Q. Is that statement still correct today?

22 A. No.

23 Q. How is it incorrect today, Dr. Hopke?

24 A. We have gotten some additional documents
25 since that time and so I want to reserve my opportunity

1 to potentially revise this once I have a chance to fully
2 digest the most recent Barr report and other associated
3 documents.

4 Q. Okay. And the most recent Barr report that
5 you just mentioned is what?

6 A. March of 2018, it came about a week or so
7 ago.

8 Q. And I think you mentioned that you haven't
9 reviewed that yet?

10 A. Not completely, no, didn't have time.

11 Q. Okay. You've reviewed it partially?

12 A. I've looked at it briefly. I just haven't
13 had a chance to dig into it.

14 Q. You haven't evaluated it for purposes of
15 amending your opinion here today?

16 A. Right.

17 Q. And I think you mentioned -- did you mention
18 associated documents in addition to the Barr report?

19 A. Yes, because the appendices now list some
20 new references that I need to get and read and fully
21 understand relative to the Barr report.

22 Q. Based on the -- based on looking at the Barr
23 report, did you see anything in it that changes your
24 opinion as you sit here today?

25 A. In a cursory, review, no, there was nothing

1 dramatically different but I -- again, I just want to
2 make sure that I've reviewed the most recent and
3 complete report.

4 Q. Other than reviewing that March 2018 Barr
5 report and any new documents to you cited in the
6 appendices, do you plan on doing any other work relating
7 to your class certification opinion in this case?

8 A. Not that I know of at this time but there's
9 still discovery going on, as I understand it, and so
10 that leads to the possibility of needing to review
11 additional material.

12 Q. As you sit here, you understand it's my
13 opportunity to find out what your intentions are as
14 you're sitting here today?

15 A. Sure.

16 Q. You're not sitting there today thinking I
17 know I'm going to be X but I'm not telling him about.
18 Is there anything you're planning on doing today
19 specifically in addition to reading the Barr report and
20 the appendices other than the documents you mentioned?

21 A. No, I'm sorry, no.

22 Q. Is there anything else about that statement
23 that we read in your Declaration on page 1 that is no
24 longer accurate as we sit here today?

25 A. No.

1 Q. Is there anything in your Class Certification
2 Report that you want to correct?

3 A. Let's see. Yeah --

4 Q. You're flipping through Exhibit 1 now?

5 A. Right. There is a couple of errors that
6 we've caught.

7 Q. As you do that, Dr. Hopke, unless you were
8 going to say something else, I was going to note for the
9 record you're reviewing from a binder right now, not the
10 Exhibit 1?

11 A. I can do it from here. I haven't marked
12 this one up either.

13 Q. Sure, you can do whatever you like. I was
14 going to ask you what is that binder?

15 A. This is a binder of all of the supporting
16 documents that were referenced, so that when we need to
17 look at them, we have them available.

18 MR. FLEMING: Okay. We'll probably mark
19 that as an exhibit and have it copied.

20 MR. DAVIS: That's fine.

21 A. I won't have to carry it back.

22 Q. We can mark the binder you brought with you
23 as Exhibit 3.

24 (Hopke Exhibit 3, Class Certification
25 Expert Report and Supporting Documents,

1 marked for identification, this date.)

2 Q. Are there any notes or writings within the
3 documents in the binder, Dr. Hopke?

4 A. No. On page 6.

5 Q. Page 6 of Exhibit 1, right?

6 A. Right. At the bottom of the page, it says
7 "based on these five factors" and there are four, so
8 that five should be a four.

9 Q. Okay. I see. So it says, "in summary
10 particulate and gaseous PFOA emissions from the
11 Bennington and North Bennington facilities were
12 uncontrolled based on these five factors." You're
13 pointing out that five should be four. There's only
14 numbered 1 through 4 below it, right?

15 A. Exactly. Okay. On page 4, in the third
16 paragraph, it's the fourth line where it starts 1968 to
17 '78 and nearly 3,000 --

18 Q. I'm sorry, I'm not with you. On page 4 --

19 A. Maybe it got printed differently here.

20 Q. What does the paragraph begin with?

21 A. Paragraph begins with "based on the lack."

22 Q. I see the paragraph now.

23 A. Fourth line down.

24 Q. Okay.

25 A. The 3,000 should be 2,500.

1 Q. Okay. And if I may follow up, Dr. Hopke, why
2 should the 3,000 be 2,500 there?

3 A. Because I made a mistake putting it in when
4 I did this last summer. I have the calculation but
5 somehow I miswrote it when I wrote the report.

6 Q. It's just a calculation error? What figure
7 was calculated to be an error, what input?

8 A. Okay. This input came from a 2001
9 spreadsheet that we obtained from Saint-Gobain with
10 regard to estimations of emissions that were going to
11 support their permit application for Merrimack.

12 Q. Was there a specific figure that was input
13 incorrectly? What --

14 A. No, I just miscopied from my spreadsheet
15 into the report.

16 Q. Was it one number or a series of numbers?

17 A. Just what one number?

18 Q. What was that one number?

19 A. The total -- the total was 2,441 and I
20 should have put in 2,500 instead of 3,000.

21 Q. Okay. Was it a rounding error?

22 A. Yeah.

23 Q. Okay. Thank you for pointing that out. When
24 did you realize that, Dr. Hopke?

25 A. Yesterday when we reviewed it.

1 Q. And who is the "we" who reviewed it?

2 A. Mr. Davis and myself.

3 Q. Is there anything else in your Class
4 Certification Report that you'd like to correct?

5 A. No.

6 Q. Okay. Let's mark as Exhibit 4, this document
7 dated December 15, 2017 and it's entitled Merits Report
8 of Philip K. Hopke, correct?

9 A. That's correct.

10 (Hopke Exhibit 4, 12/15/17 Merits Report
11 of Philip K. Hopke, marked for
12 identification, this date.)

13 Q. Does your Merits Report contain a complete
14 statement of all the opinions you intend to express on
15 the merits of the case?

16 A. Again, up to this point. Again, we want to
17 be in a position to utilize any new information
18 available to potentially modify it.

19 Q. And are you intending on gathering any new
20 information beyond that Barr report from March 2018 that
21 we discussed previously as well as documents cited
22 within it?

23 A. Again, I've been told there are potentially
24 additional depositions coming that may reflect on this
25 Merits Report and so if there are, if there is

1 additional information, I want to be in a position to
2 fully utilize it.

3 Q. I'd like to do as best we can, identify
4 anything and everything that you're considering
5 reviewing after you leave today's deposition. We've got
6 the Barr report?

7 A. Right.

8 Q. We've got the documents cited within it,
9 right? We've got depositions to be taken in this case.
10 Is there anything else that you have on your mind that
11 you may be reviewing as we move forward?

12 A. Not that I know of.

13 MR. FLEMING: To the extent that
14 Dr. Hopke does any additional work in support
15 of his opinions after today's deposition,
16 we'd request notice of that and an
17 opportunity to ask Dr. Hopke questions about
18 it.

19 MR. DAVIS: We'll provide a supplemental
20 opinion as per the rules.

21 BY MR. FLEMING:

22 Q. And as with your Class Certification Report,
23 does your Merits Report also explain all the facts or
24 data that you considered when forming the opinions
25 expressed in your Merits Report?

1 A. Yes.

2 Q. The same is true for your Class Certification
3 Report?

4 A. Yes.

5 Q. Did I ask you, is there anything in your
6 Merits Report dated December 15, 2017 that you'd like to
7 correct?

8 A. No.

9 Q. And appended to both Exhibit 1 and Exhibit 4,
10 so your Class Certification Report and your Merits
11 Report, is a CV, right?

12 A. Yes.

13 Q. Is that your most complete and up-to-date CV?

14 A. No. Again, I keep publishing papers so
15 we're now up to 659 so I've provided the most recent one
16 to Mr. Davis and if you need one, I'm sure he can
17 provide it or I can --

18 MR. FLEMING: We'd request a copy of
19 Dr. Hopke's current CV.

20 MR. DAVIS: Sure.

21 Q. As you sit here today I haven't seen it so I
22 don't know but --

23 MR. DAVIS: I just got it yesterday.

24 Q. -- are you able to identify how it's
25 different from what was given counsel?

1 A. Okay. I don't know exactly when you got it
2 but, again, I -- last year I published 51 journal papers
3 and one book chapter so I get a paper coming out --
4 paper coming out roughly once a week so it gets updated
5 regularly.

6 MR. DAVIS: Let the record reflect that
7 the CV that we have here attached to
8 Exhibit 4 and Exhibit 1 does not have a list
9 of publications so...

10 THE WITNESS: Oh, okay, I didn't realize
11 that.

12 Q. So it doesn't have any of that 650 something
13 that you're mentioning; it's got zero?

14 A. I don't remember what.

15 Q. Do you have another CV in a different format
16 as compared to the one that was given to counsel?

17 A. Sure.

18 MR. FLEMING: Okay. We have -- will you
19 provide that to us, Gary.

20 MR. DAVIS: Yeah. Is that what you
21 provided to me?

22 THE WITNESS: Yeah, that's what I sent
23 to you over the weekend.

24 MR. DAVIS: Sure, I'll just forward it
25 to you when I get the chance.

1 THE WITNESS: It has a list of all the
2 publications and conference presentations,
3 et cetera.

4 BY MR. FLEMING:

5 Q. Dr. Hopke, how did you come to be retained in
6 this case?

7 A. I got a call from Emily Joselson of the -- I
8 don't remember what the law firm in Vermont, indicating
9 they were looking for somebody who could help them with
10 particularly the air dispersions and deposition from
11 this -- these plants and would I be interested in doing
12 that? And I indicated, yes, but I really wasn't running
13 a dispersion model on a routine basis and so I wanted to
14 bring in TRM, which is a small consulting firm that I'm
15 a 15 percent partner in, because we could then engage
16 Gary Yoder, who I knew was routinely running AERMOD, had
17 it all up to date, could do the modeling much more
18 easily than I could in terms of setting up the model and
19 running it, and so they agreed, ultimately agreed to
20 that, and they engaged TRM to do the work with Mr. Yoder
21 doing the AERMOD modeling and I doing the rest that's
22 described in the reports.

23 Q. When was that, Dr. Hopke?

24 A. It started in December of '16 with the
25 calls. We went through some negotiations in January and

1 February of last year and by the end of February, they
2 engaged TRM to assist them.

3 Q. What type of negotiations did you engage in
4 before -- with Plaintiffs' counsel?

5 A. Most of that was done by the managing
6 partner, Cathy Dare. Mostly a matter of rate sheets and
7 scope of work in a phased manner. So we had a phase 1
8 where we started basically scoping out what would need
9 to be done and subsequent phases as we got more engaged.

10 Q. And when you were first approached, were you
11 asked to do a -- to provide an opinion in support of
12 class certification only or were you asked to provide an
13 opinion in support of class certification and the
14 merits?

15 A. Initially class certification and the merits
16 came afterward.

17 Q. When were you first retained by Plaintiffs'
18 counsel to offer an opinion on the merits?

19 A. It would have been around October. I don't
20 know for certain. October '17 because it took a while
21 to get it written and submitted by December.

22 Q. And what was the ultimate scope of your
23 assignment, starting with class certification?

24 A. Again, to look at the -- particularly the
25 emissions, you know, what was the effect -- effective

1 emissions rates, what was the nature of the process that
2 would lead to the emissions rate, what was the, you
3 know, our view of the other opinions with regards to the
4 emissions that would be coming in terms of the
5 partitioning between stack emissions and destruction,
6 other aspects of the physical chemistry of the process,
7 and then also an assessment of the control -- the
8 pollution control system.

9 Q. Anything else, Dr. Hopke?

10 A. Again, helping to provide that kind of input
11 data to Mr. Yoder and also reviewing the results from
12 Mr. Yoder's modeling to see whether those made
13 reasonable sense, cross check on the modeling effort.

14 Q. How about on the merits, Dr. Hopke, what was
15 the scope of your assignment there?

16 A. Again, looking at these various aspects of
17 the -- how the plant was operated over time in terms of
18 their behavior relative to the pertinent rules and
19 regulations, the normal approach to maintaining and
20 utilizing effective pollution controls, what you would
21 normally think of in terms of needs for effective
22 controls for this type of facility and -- you know, so
23 basically the kinds of things that are outlined in the
24 merit report.

25 Q. And if we could turn back to Exhibit 1,

1 Dr. Hopke, your Class Certification Report, at the
2 second paragraph there on page 1, you see the first line
3 there, second paragraph at page 1 begins "the
4 accompanying expert report has been prepared by TRM in
5 support of Sullivan" and has the case name, right?

6 A. Mm-hmm.

7 Q. Who at TRM prepared this report?

8 A. Me.

9 Q. Are all of the opinions stated in this report
10 yours?

11 A. Yes.

12 Q. Are there any opinions in this report that
13 are someone else's?

14 A. No.

15 Q. What is TRM? Did you say you owned 15
16 percent of it?

17 A. Yeah. It is a woman-owned consulting
18 company that consists of three people, Catherine Dare,
19 who's the majority partner, Timothy McAuley, and myself.
20 Tim McAuley was a Ph.D. student at Clarkson, not mine.
21 He started another consulting firm which I was a partner
22 with for a while and then withdrew, but he had brought
23 Cathy in at that point and he had started TRM as a
24 separate company that he used for his expert consulting
25 but we decided that the best approach would be if we

1 could have a woman-owned business. So he sold a
2 majority share to Cathy and I bought in for 15 percent.

3 Q. How many employees does TRM have?

4 A. I'm not exactly sure but I think we have two
5 at the moment.

6 Q. Who are they?

7 A. I don't know. I don't really get involved
8 with the day-to-day management of the business. I'm
9 primarily there for helping with these kinds of
10 projects.

11 Q. What is Mr. Yoder's relationship with TRM?

12 A. He's an independent consultant.

13 Q. To TRM?

14 A. To TRM.

15 Q. How often does he provide consulting services
16 to --

17 A. Well, this is the only case for TRM. He had
18 previously worked with CHANGE, the other company, in --
19 with response -- in a case where we were looking at the
20 dispersion of fracking sand in Pennsylvania.

21 Q. Did you provide any testimony in that case?

22 A. No.

23 Q. Or any expert reports?

24 A. I provided Gary with information on
25 emissions but I never got -- I never was involved in

1 writing any of the reports.

2 Q. And I think you referred to this CHANGE as
3 the other what?

4 A. Right. That's the other consulting company
5 that Dr. McCauley owns; he's the majority partner there
6 and Cathy is the minority partner.

7 Q. I didn't see any reference on the CV that was
8 provided to us.

9 A. I'm not part of CHANGE anymore. I haven't
10 been for three years now.

11 Q. You typically list things on a CV that you're
12 no longer a part of; it's sort of a historic document,
13 right?

14 A. Well, it was an academic CV.

15 Q. For example, you list your education. You're
16 no longer at that education, right? You list your
17 prior jobs. I'm just asking, CHANGE was not on the CV
18 that was provided to us?

19 A. Right and, again, I didn't think of it as
20 being particularly pertinent to -- as I said, my vitae
21 is normally for academic purposes, for proposals and
22 other kinds of things like that, so it wasn't terribly
23 relevant.

24 Q. So what is CHANGE?

25 A. Consulting for health and environment and

1 greener something.

2 Q. How long were you a part of it?

3 A. About two years.

4 Q. What was your role with it?

5 A. I was again a partner, when Dr McAuley was
6 getting it going, he was looking for people to basically
7 help put some money in to get it going, and so I did
8 that and helped him get started.

9 Q. Did it have any stated mission?

10 A. Again, it's an environmental consulting firm
11 that's trying to do a, support work for whatever client.

12 Q. It didn't have any stated mission?

13 A. Not that I remember.

14 Q. Did anyone else aside from yourself
15 contribute to your Class Certification Report?

16 A. Only, you know, by basically Gary Yoder's
17 report as part of the overall.

18 Q. I'm not sure I follow that, forgive me,
19 Doctor.

20 A. Again, there's no opinions based on that but
21 I had reviewed it and that's why there's the statement
22 in there with regards to, you know, the Section 4 on
23 page 7 saying that we reviewed his report and adopt and
24 rely on those methodologies and opinions.

25 Q. I think you said "we."

1 A. It's the -- me. Imperial we. Faculty are
2 used to doing that. We think of ourselves as imperial.

3 Q. How about Ms. Dare, did she have any part in
4 this Class Certification Report of yours?

5 A. No. She just handled the billing.

6 Q. I think you mentioned before that you've
7 never been deposed?

8 A. Mm-hmm.

9 Q. Have you ever offered any kind of testimony
10 in any lawsuit, a trial?

11 A. No.

12 Q. Have you ever submitted an expert report in
13 any kind of lawsuit?

14 A. Yes. I was part of a class action suit
15 against Stelco, which is the -- which had bought the
16 steel plant component of the LaRouge complex in
17 Dearborn. We had previously done some source
18 identification and the apportionment at the nearby EPA
19 speciation network site, and so the law firm that was
20 engaged in a class action suit against Stelco engaged me
21 to basically present that material as part of their
22 input and -- but Stelco settled before it ever got to
23 the point of deposition and trials.

24 Q. And when was this, Dr. Hopke?

25 A. 2010.

1 Q. And what was the name of the law firm who
2 retained you?

3 A. I don't remember. I'd have to look it up.

4 MR. DAVIS: I'm going to object to the
5 question because it's beyond the four years
6 that's required by the federal rules but he
7 can answer questions if he knows.

8 Q. Any other examples where you've offered an
9 expert report in connection with litigation?

10 A. Never actually wrote a report but I provided
11 materials in two patent cases, one on behalf of
12 Honeywell and one on behalf of IBM and, again, I don't
13 remember the law firms but, again, that was five or six
14 years ago.

15 Q. Did any of those patent cases have anything
16 to do with fluorinated compounds?

17 A. No.

18 Q. Same question on Stelco did that have
19 anything to do with fluorinated compounds?

20 A. No.

21 Q. Any other work you've done in connection with
22 litigation?

23 A. No. I try to avoid it, stay out of
24 depositions.

25 Q. If you turn to page 8 of your Class

1 Certification Report, Dr. Hopke. Thank you, so Exhibit
2 1 again, I was going to ask you a question about the
3 citations on page 8 there under number 5.

4 A. Mm-hmm.

5 Q. Are those nine citations the materials you
6 relied on for forming your opinions on class
7 certification in this report?

8 A. Yes.

9 Q. Are there any other documents you relied on
10 to express your class certification opinion that are not
11 listed on this page 8 at number 5?

12 A. No.

13 Q. How did you come to gather these particular
14 citations that are listed on page 8 of number 5?

15 A. The bulk of these were provided by counsel.
16 We got an enormous number of documents, which I spent a
17 fair amount of time sorting through to find things that
18 were relevant and, see, we do have the Barr report in
19 here, don't we? Yeah, must have. Mm-hmm, do we have it
20 in here? Have we listed the Barr --

21 Q. You have to speak a little bit more audibly.

22 MR. DAVIS: Speak up to him, please.

23 A. It doesn't look like we listed the Barr
24 report which is obviously in here. Clearly we looked at
25 that.

1 Q. And, again, when you say "we" --

2 A. Me.

3 Q. -- that's the imperial professor; that's
4 Dr. Hopke?

5 A. Yes.

6 Q. The Barr report, which version of the Barr
7 report did --

8 A. This would have been the June 2017 report,
9 which is what's in --

10 Q. So you relied on the Barr report from June
11 2017. You'd like to add that to your citations here?

12 A. Yes.

13 Q. Anything else you'd like to add that you
14 relied on in forming your opinions?

15 A. I don't think so. I should have caught that
16 yesterday.

17 Q. Who selected these particular documents to
18 include on page 8 at number 5?

19 A. I did.

20 Q. Did you mention that you were given documents
21 by counsel?

22 A. Right.

23 Q. Can you describe to me what you were given?

24 A. We were given, you know, all of the Vermont
25 documents that I'm aware of; in other words, the permit

1 applications, the inspection reports. We were provided,
2 again, a lot of the material -- the material that they
3 had obtained through discovery, and then the Barton --
4 you know, again, started doing literature searches and
5 came upon Barton and went and got her thesis as well and
6 several derivative papers but everything is really in
7 the thesis.

8 Q. Let's see if I can break that down. You were
9 given documents by counsel?

10 A. Mm-hmm.

11 Q. You obtained the Barton on your own?

12 A. Yeah.

13 Q. And some citations within Barton you obtained
14 on your own?

15 A. Yeah. Again, they're just really chapters
16 in the Barton thesis.

17 Q. Aside from what counsel gave you, did you
18 obtain anything else on your own other than the Barton
19 thesis and the citations that you mentioned?

20 A. Yeah, I obtained, you know, some background,
21 other background journal papers on Teflon decomposition
22 and other kinds of things so I could get
23 some background -- improve my background on fluorocarbon
24 compound processing.

25 Q. So in terms of what you obtained, you've got

1 the Barton, some citations in the Barton report or
2 thesis, right? Some other background journal papers.
3 Anything other than that as you're sitting here right
4 now that you can identify that you obtained outside of
5 what counsel gave you?

6 A. No.

7 Q. Did counsel describe to you what they were
8 giving to you?

9 A. No, not in detail. Again, indications that
10 these were documents obtained from Saint-Gobain. These
11 were documents obtained from Vermont DEC but just
12 general category.

13 Q. Did you have any understanding as to why they
14 were providing that to you?

15 A. Well, that it provided a host of the
16 background material and then, you know, letting me look
17 through and decide what was going to be relevant for the
18 development of the report.

19 Q. Did they provide you a complete set of all
20 the documents that Saint-Gobain has produced in this
21 lawsuit?

22 A. I don't know that one way or the other.

23 Q. You didn't ask them to do that?

24 A. No.

25 Q. So you relied on them for their selection of

1 documents to provide to you to form your expert opinion?

2 A. Yes.

3 Q. How about the background documents from
4 Vermont? Do you have any understanding of the criteria
5 that Plaintiffs' counsel applied in giving you
6 documents?

7 A. Well, basically a bunch of those documents
8 were available -- we got via downloading from the
9 Vermont website. So I assume that the website contained
10 all of the relevant documents or at least all of the
11 documents that Vermont was willing to release.

12 Q. Do you know if the Vermont website has all of
13 the documents that Saint-Gobain has produced in this
14 lawsuit?

15 A. I don't know.

16 Q. You didn't ask that, right?

17 A. No.

18 Q. What criteria did you use in searching the
19 Vermont website?

20 A. Basically I just downloaded everything that
21 was -- that was included and then looked through them to
22 try and find the ones that were most relevant to what I
23 needed to do.

24 Q. So you downloaded the entirety of what from
25 the Vermont website?

1 A. Again, there were inspection reports; there
2 were permit applications; there were comments on the
3 Barr reports. There were -- I think that was most of
4 it. I don't remember anything else.

5 Q. Going back to the documents that Plaintiffs'
6 counsel provided to you, were they organized in any way?

7 A. Not particularly.

8 Q. Were any of the documents that Plaintiffs'
9 counsel provided you also ones that were on the Vermont
10 website?

11 A. I don't know. There could well have been
12 duplicates but all this was coming last spring and it
13 just took a lot to just get them all together and look
14 through and find the ones that were going to be most
15 pertinent to what I needed to do.

16 Q. What was the volume of material that
17 Plaintiffs' counsel provided you?

18 A. It was hundreds of documents.

19 Q. Was it a box, two boxes?

20 A. All electronic.

21 Q. Okay. Did you print it out?

22 A. A few. Again, for the initial review I
23 could do it faster electronically with being able to
24 search the documents than I could trying to kill a lot
25 of trees.

1 Q. How about the volume of material that you
2 printed out from the Vermont website?

3 A. Very little of that I printed out anything.
4 Again, it didn't have a lot of the process description
5 or other things that needed to go into the class
6 certification.

7 Q. Do you remember anything you printed out from
8 the Vermont website?

9 A. I think the only thing was the 1990 permit
10 application.

11 Q. Other than the 1990 permit application, did
12 you print anything else out?

13 A. Not that I remember.

14 Q. Why did you choose to print out that 1990
15 permit application?

16 A. Because that was what I wanted to see, is
17 what they were describing in terms of their control
18 technology.

19 Q. And turning to your Merits Report, Dr. Hopke.
20 As you do that, if I could just ask one last question on
21 your Class Certification Report, have we discussed
22 everything you considered or relied on in terms of your
23 Class Certification Report?

24 A. Yes.

25 Q. Turning to your Merits Report, which is

1 Exhibit 2?

2 A. Yeah.

3 MR. DAVIS: I think it's 4.

4 A. 4.

5 Q. I was close, sorry. Exhibit 4, thank you for
6 that correction. Are all of the materials that you
7 relied on in forming your opinions in this merit report
8 cited within the report, Dr. Hopke?

9 A. Yes.

10 Q. And how about the materials that you
11 considered in putting together this report? Are they
12 the same documents we already discussed?

13 A. No, this is really -- there really are sort
14 of a separate set of documents for the Merits Report
15 because it was much more involved than a number of the
16 internal memos and other materials that weren't directly
17 relevant to the process.

18 Q. And you were pointing out another binder
19 there, right?

20 A. Yeah, I'm hoping to get rid of that one,
21 too.

22 Q. We'll mark that as an exhibit as well. If
23 you could describe what it is and mark it as the next
24 exhibit.

25 A. Yes. It's the merit report and copies of

1 each and every of the things that are cited on the
2 citation page or, you know -- well, they're -- in this
3 case they aren't cited but in the report you'll note
4 there are a number of references to specific documents
5 and all of those documents are there so --

6 MR. FLEMING: Okay. Could we mark as
7 Exhibit 5, the binder that Dr. Hopke just
8 described relating to his Merits Report.

9 (Hopke Exhibit 5, Merits Expert Report
10 and Supporting Documents, marked for
11 identification, this date.)

12 THE WITNESS: Get rid of my
13 weightlifting kit.

14 BY MR. FLEMING:

15 Q. Are those all the documents that you
16 considered in your -- in forming your report in your
17 merits opinion?

18 A. Again, I looked through a number of other
19 documents but they weren't relevant so I, you know,
20 again did a lot of scanning to see where I could find
21 things that I needed to include and reference and those
22 which weren't relevant, I didn't include.

23 Q. So did Plaintiffs' counsel provide you
24 documents relating to your Merits Report as well?

25 A. Yes, again, all of this material that came

1 originally and in the spring of '17 were there but,
2 again, I first culled them for things which were
3 relevant to the process and then culled them for things
4 that were relevant to the merits.

5 Q. You started with that same universe of
6 documents that Plaintiffs' counsel provided you?

7 A. Yes.

8 Q. You culled from that things that you thought
9 were relevant for your class certification opinion and
10 then documents that you felt were relevant to your
11 merits opinion, right?

12 A. Yes.

13 Q. Did you collect any documents yourself in
14 support of your merits opinion aside from what
15 Plaintiffs' counsel provided to you?

16 A. No.

17 Q. Okay. Maybe if WE could shift gears just a
18 little bit, Dr. Hopke. You have a Ph.D. in chemistry,
19 correct?

20 A. Yes.

21 Q. So you're a chemist; is that fair?

22 A. Yeah.

23 Q. Are you a hydrogeologist?

24 A. No.

25 Q. Are you an engineer?

1 A. Again, yes. I have had appointments in the
2 Department of Civil and Environmental Engineering at the
3 University of Illinois at Urbana-Champaign and the
4 Department of Nuclear Engineering at Urbana-Champaign.
5 Since 2000 and to the time I retired I was in the
6 Department of Chemical and Biomolecular Engineering at
7 Clarkson. I had a joint appointment in civil and
8 environmental engineering from the time I went to
9 Clarkson in 1989. I directed Ph.D.s in environmental
10 engineering, nuclear engineering, chemical engineering,
11 engineering science.

12 We have just developed and in the process of
13 patenting the process to suppress carbon monoxide
14 emissions from stored wood pellets that's being actually
15 implemented at a pellet mill in Massena, New York. So
16 I've done a lot of engineering. I've published a lot of
17 engineering. You know, I haven't gone and gotten a PE
18 or any of that sort of thing but, you know, I've been a
19 member of engineering faculty and supervised multiple
20 engineering Ph.Ds.

21 Q. Are you a materials scientist?

22 A. No, although I've taught a course in
23 introduction to materials science.

24 Q. You don't hold yourself out as an expert in
25 materials science?

1 A. No.

2 Q. Correct?

3 A. Yes.

4 Q. How about an experimental kineticist?

5 A. Yes.

6 Q. When you say, yes, do you hold yourself out
7 as an expert as an experimental kineticist?

8 A. Yes, I am -- for example, developed the
9 kinetics of this carbon monoxide suppression process.

10 Q. How about a biochemist; do you consider
11 yourself to be a biochemist?

12 A. No.

13 Q. Are you an expert on stack testing?

14 A. We have done a number of stack tests. We
15 have done stack testing for a small coal-fired power
16 plant, for multiple biomass combustion systems, for
17 chassis dynamometers. I certainly understand and have
18 done it, done it routinely. You know, again, it depends
19 on how you want to define "expert."

20 Q. Have you ever held yourself out as an expert
21 in stack testing?

22 A. No.

23 Q. You're not a toxicologist, right?

24 A. No.

25 Q. You mean correct --

1 A. Right.

2 Q. -- you're not a toxicologist?

3 A. Not a toxicologist.

4 Q. Are you an epidemiologist?

5 A. No, I'm not.

6 Q. Are you a medical doctor?

7 A. No.

8 Q. Are you a lawyer?

9 A. No.

10 Q. You're grateful for that. Are you an
11 historian?

12 A. No. I have done archeology.

13 Q. But you're not an historian?

14 A. No.

15 Q. Correct?

16 A. Correct.

17 MR. FLEMING: Want to take a two-minute
18 break as we shift gears a little bit?

19 MR. DAVIS: Sure.

20 THE VIDEOGRAPHER: Time is approximately
21 9:41. We are off the record.

22 (A recess was then taken.)

23 THE VIDEOGRAPHER: We are on the record.

24 The time is approximately 9:51. Please
25 continue.

1 BY MR. FLEMING:

2 Q. Ready to go ahead, Dr. Hopke?

3 A. Yes.

4 Q. Before, when we were talking about the
5 materials you relied on or considered in connection with
6 your Class Certification Report and your Merits Report,
7 do you recall getting a subpoena requesting those
8 documents to be produced to us?

9 A. Yes.

10 Q. Have those documents been produced to us?

11 A. Yes.

12 Q. And I think before, Dr. Hopke, you were
13 mentioning that part of your class certification opinion
14 relates to alleged emissions rates from Saint-Gobain or
15 ChemFab's facility in Vermont, right?

16 A. Yes.

17 Q. Your report doesn't express any opinion,
18 right, on where those emissions went; am I correct about
19 that?

20 A. That's correct.

21 Q. Your report doesn't express an opinion on
22 whether or how much of any air emissions got into
23 groundwater; is that correct?

24 A. That's correct.

25 Q. Did you visit any of the sites where these

1 former plants are located?

2 A. No.

3 Q. Did you visit any of the Plaintiffs or anyone
4 else's homes in the area?

5 A. No.

6 Q. Did you conduct any testing yourself?

7 A. No.

8 Q. Did you visit any facilities to assess the
9 operating conditions as they may have existed at these
10 former plants?

11 A. No.

12 Q. Did you rely on testing for PFOA or APFO at
13 any ChemFab or Saint-Gobain facility?

14 A. Yes. We looked at the Merrimack
15 measurements and we looked at the lack of APFO/PFOA
16 measurements at the Bennington plants.

17 Q. Okay. See if we can break that down. I
18 asked if you relied on any testing for PFOA or APFO for
19 any Saint-Gobain or ChemFab facility, right?

20 A. Right.

21 Q. You mentioned Vermont and you mentioned
22 Vermont didn't have any such testing, right?

23 A. Right.

24 Q. You obviously you didn't rely on that
25 testing?

1 A. Well, I relied on the -- it's one of the
2 things we comment on is that they did not measure for
3 either of those compounds in their set of -- in the
4 stack tests that they did do.

5 Q. Let me see if I can ask it more clearly. Did
6 you rely on any testing for PFOA or APFO at any
7 Saint-Gobain or ChemFab facility in Vermont?

8 A. No.

9 Q. You mentioned Merrimack, right?

10 A. Right.

11 Q. Did you rely on the testing data that was
12 performed at the facility in New Hampshire?

13 A. I reviewed it. I didn't rely on it because
14 that was a different control system and, therefore, not
15 relevant to the Bennington plant.

16 Q. I think that answered my question. You
17 reviewed that data but you did not rely on it, correct?

18 A. Right.

19 Q. Is there any data that you relied on of
20 testing any ChemFab or Saint-Gobain facility for PFOA or
21 APFO?

22 A. No.

23 Q. Prior to this case did you have any
24 experience with PTFE coating towers?

25 A. Not directly, no.

1 Q. Did you have indirect experience with PTFE
2 coating towers?

3 A. No, just again, reading the material and
4 understanding the process.

5 Q. That was after you were retained, right?

6 A. Yes.

7 Q. So before you were retained --

8 A. No, no knowledge whatsoever.

9 Q. How about PFOA or APFO, before you were
10 retained did you have any experience with APFO or PFOA?

11 A. Yes. I'm part of the Clarkson team that
12 runs the Great Lakes Fish Monitoring Surveillance
13 Program for the Great Lakes National Program Office of
14 the EPA, and we are in the process of developing
15 analytical procedures for looking at PFOA in fish tissue
16 and components of the food web in the Great Lakes.

17 Q. Did any of that work involve estimating
18 emissions from facilities for PFOA or APFO?

19 A. No.

20 Q. Your reports don't reflect any assessment of
21 the scientific literature by you to offer an expert
22 opinion on whether PFOA or APFO causes any adverse
23 health effects in humans, right?

24 A. Right.

25 Q. And you're not going to be offering an

1 opinion on any of those subjects, right?

2 A. No.

3 Q. You mean correct?

4 A. Correct.

5 Q. So I've mentioned APFO and PFOA. What is
6 APFO, let's start there?

7 A. Ammonium perfluorooctanoic acid; octane
8 actually because it's neutral salt.

9 Q. What is PFOA?

10 A. That's perfluorooctanoic acid.

11 Q. Are they different chemical substances?

12 A. Yeah. You have the basic carbon chain with
13 the carboxylic acid. The question is what's an acid?
14 If it's hydrogen, it's PFOA, and if it's an ammonium
15 moiety, then it's ammonium APFO.

16 Q. So am I right that the chemical properties
17 for APFO and PFOA are not the same, correct?

18 A. Correct.

19 Q. How about PFO-, what is that?

20 A. That's the ion that would be in the
21 solution.

22 Q. Are the chemical properties of PFOA minus
23 different from APFO and PFOA?

24 A. They're interrelated by their -- again, it's
25 an ion in solution as opposed to potentially a salt or

1 an acid which could stand on its own.

2 Q. So in terms of the chemical properties of
3 PFOA -- strike that.

4 In terms of comparing the chemical properties
5 of PFO-, are they the same as or different from APFO?

6 A. There are differences, yeah.

7 Q. And are there also differences between PFO-
8 and PFOA in terms of their chemical properties?

9 A. Yes.

10 Q. Do the three turn into gases at the same
11 temperature?

12 A. At different rates.

13 Q. So let me break that down. The three turn
14 into gases, meaning PFO minus, APFO and PFOA, at the
15 same temperature, is that your testimony?

16 A. Okay. In other words, APFO will sublime;
17 PFOA will evaporate. PFO minus would have to pick up a
18 hydrogen in order to be able to volatilize. That all
19 would be possible at a given temperature but at
20 different rates.

21 Q. Are they all volatile to the same extent or
22 to a different extent? You mention PFO minus -- I'm
23 sorry, go ahead.

24 A. Yeah, to a different extent.

25 Q. Have you heard that PFO minus is not volatile

1 in solution?

2 A. Yes.

3 Q. Do you agree with that?

4 A. Yes.

5 Q. Does APFO volatilize as much as PFOA while
6 being heated in solution?

7 A. Does what?

8 Q. Does APFO volatilize as much as PFOA while
9 being heated in solution?

10 A. APFO would not -- would not be in solution.
11 It would disassociate into an ammonium ion and PFOA
12 minus at reasonable solubility.

13 Q. Have you ever read that APFO does not
14 volatilize as much as PFOA?

15 A. Yes.

16 Q. Does it in fact volatilize significantly less
17 than PFOA?

18 A. Yes.

19 Q. Can you estimate how much less APFO
20 volatilizes as compared to PFOA?

21 A. Yes. You know, when you look up the
22 saturation vapor pressures at a given temperature, we
23 can apply that to an equation to estimate what it is as
24 a function of temperature.

25 Q. Do you have any quantification of what that

1 relationship would be?

2 A. Hum?

3 Q. Can you quantify that at all?

4 A. I could given enough -- given time and
5 access --

6 Q. As you sit here today?

7 A. No, I can't off the top of my head.

8 Q. Would it be accurate to estimate that APFO
9 volatilizes about one-one thousandth as fast as PFOA?

10 MR. DAVIS: Object to the form of the
11 question.

12 A. I don't know right offhand; I'd have to look
13 it up.

14 Q. As you sit here today, does that sound wrong
15 to you? Do you have an opinion on that?

16 MR. DAVIS: Objection.

17 A. I don't have an opinion.

18 Q. In forming your opinions in this case, did
19 you come to any judgment on the different rate at which
20 APFO volatilizes as compared to PFOA; in other words,
21 did you ever know that?

22 A. Yeah, I looked at it in detail last summer
23 but I don't remember the numbers in specific detail
24 right now.

25 Q. So you think last summer you would have

1 calculated the different rate --

2 A. Well, I didn't calculate. I mean, I
3 examined the potential for volatilization and felt that,
4 you know -- and provided the opinion that I've written.

5 Q. But you recall enough to know that APFO
6 volatilizes significantly less as compared to PFOA?

7 MR. DAVIS: Objection to the question.

8 Q. Is that fair?

9 A. Yes.

10 Q. What is PTFE, Dr. Hopke?

11 A. Okay, trying to remember exactly what --
12 it's the polyethylene polymer of fluorocarbon,
13 perflouronated something, ethylene. It's the solvent
14 polymer, the Teflon.

15 Q. What are its properties?

16 A. It's a solid at room temperature. It's
17 obviously hydrophobic. It's slippery and nonstick.

18 Q. Do you know what -- in what form it would
19 have come to ChemFab or Saint-Gobain?

20 A. A fine powder, 25 micron size powder if I
21 remember correctly.

22 Q. Do you know if it came in any other form?

23 A. Not that I'm aware of.

24 Q. Do you know how many different kinds of PTFE
25 there are by any chance?

1 A. No.

2 Q. Do you know if it's base or acidic?

3 A. I don't know.

4 Q. What's a surfactant?

5 A. A surfactant is a material which allows
6 the -- to reduce the interaction between materials so
7 that you can support a suspension. Typically it's used
8 to take a material and solubilize it.

9 Q. Do you know what -- in what form a surfactant
10 came to Saint-Gobain or ChemFab?

11 A. It came as solutions of these fluorocarbon
12 materials. The FC and the materials from 3M or FC and
13 the material from DuPont was another solution of these
14 perfluorocarbons.

15 Q. Do you know how many different kinds of
16 surfactants Saint-Gobain or ChemFab used?

17 A. You know, the list that we had, it was
18 something of the order of five or six but that may be an
19 underestimate.

20 Q. And were the surfactants base or acidic?

21 A. Could be either depending on what it's used
22 for.

23 Q. The ones that you reviewed, did you determine
24 the pH level of any of those?

25 A. They're on the MSDS. They run from 4 to 10.

1 Q. Do you know how many different coating
2 solutions Saint-Gobain used over time or ChemFab?

3 A. No, not specifically.

4 Q. Do you have any kind of reasonable estimate
5 of the number of different coating solutions that
6 Saint-Gobain or ChemFab utilized in Vermont over time?

7 A. I would want to go back and look and cal --
8 add them up. I'd rather not speculate.

9 Q. Do I have this right, Dr. Hopke?
10 Vaporization is a conversion of a compound from a liquid
11 to a gas?

12 A. Yes.

13 Q. How about this, do I have this right; that
14 the chemical decomposition is the separation of a
15 chemical compound into two or more simpler compounds or
16 elements?

17 A. Yes.

18 Q. And vaporization and chemical decomposition
19 are two different things, right?

20 A. Yes.

21 Q. Are they the same type of chemical process?

22 A. No.

23 Q. Should those two words be used
24 interchangeably?

25 A. No.

1 Q. I think before we were talking about pH,
2 right?

3 A. Yes.

4 Q. Do you know the pH of any PTFE liquid
5 dispersion?

6 A. Not directly.

7 Q. If you could explain when you say "not
8 directly."

9 A. Well, again, if we knew what the pH of the
10 components were, we could then estimate the pH of the
11 resulting solution.

12 Q. Have you done that at all?

13 A. No, because we didn't really have detailed
14 information.

15 Q. On the pH?

16 A. On the pH.

17 Q. And, therefore, you wouldn't know the pH of
18 any coating solution either; is that fair?

19 A. Again, we know that it can't be strongly
20 acidic given the pHs of the solutions, of the
21 surfactants and the reported proportions in the coating
22 solutions.

23 Q. So the -- if I understood -- tell me -- I
24 don't want to misstate it. Tell me if I have this
25 correct. You didn't calculate the pH of the coating

1 solution because you didn't have the information
2 available; however, it would not be acidic?

3 A. It would not be strongly acidic.

4 Q. It would not be strongly acidic?

5 A. Again, the lowest pH we saw reported in the
6 MSDSes was about 4.

7 Q. Was that for a coating solution?

8 A. No, that was for the surfactant solution.

9 Q. So I'm focused now on the coating solution.

10 A. Yeah, we don't have -- there is no
11 information that I could find on the pH of the coating
12 solutions.

13 Q. Dr. Hopke, your report refers to catalytic
14 abatement pollution control technology, right?

15 A. Yes.

16 Q. What is that?

17 A. That's where you use a material which does
18 not get used up in reaction but can promote the speed at
19 which a reaction takes place.

20 Q. Had you worked on anything related to
21 catalytic abatement pollution control technology before
22 you were retained in this case?

23 A. Not worked on it but taught it in class.

24 Q. What class was that, Doctor?

25 A. Air Pollution Control.

1 Q. How about wet electrostatic pollution control
2 technology, how does that different from the catalytic
3 abatement pollution control technology?

4 MR. DAVIS: Let me object to the
5 question, misleading, but you can may answer.

6 MR. FLEMING: I'll rephrase it if
7 there's anything misleading about it.

8 MR. DAVIS: Okay.

9 Q. Let me just ask you -- I'll rephrase it.
10 Certainly not my intention to have anything be
11 misleading so I'd like to address that if I may. What
12 is wet electrostatic pollution control technology,
13 Dr. Hopke?

14 A. Again, that's where you're using electric
15 fields to charge and collect material as opposed to
16 having material deposit onto a catalytic surface and
17 decompose. So one is collection device; one is
18 decomposition device.

19 Q. Have you ever worked on any issues related to
20 wet electrostatic pollution control technology?

21 A. Again, no, but taught it in class.

22 Q. You taught both the catalytic pollution
23 control technology and this wet electrostatic pollution
24 control technology in an introductory undergraduate
25 class; is that correct?

1 A. Seniors and graduate students.

2 Q. Seniors and graduate students, okay. How
3 about wet scrubbing pollution control technology,
4 Dr. Hopke, what is that?

5 A. Again, using a droplet to typically, you
6 know, again collect gases and particles and remove them
7 from a gas stream.

8 Q. Does that differ from the other technologies
9 we just discussed?

10 A. Yes, because you're -- you're using -- you
11 can have wet scrubbers in various ways. You can
12 actually have a spray scrubber. You can have liquid
13 deposited onto solid surfaces and have the material --
14 particularly the gas is then depositing into the or --
15 absorbing into the liquid and potentially with the
16 convoluted air paths have impaction of at least larger
17 particles to remove them from the gas stream. So
18 there's a variety of ways that you can construct
19 scrubbers ranging from droplet scrubbers to packed bed
20 scrubbers.

21 Q. If we could turn to your Class Certification
22 Expert Report, Dr. Hopke, which is Exhibit 1. I'm going
23 to ask you a question about page 2, section 3.3. Give
24 you a second to get there.

25 A. Okay.

1 Q. At the fourth line, there's a sentence that
2 reads "PTFE dispersions contained PFOA as a relatively
3 low concentration component, and higher concentrations
4 (up to 100 percent) PFOA surfactant could be added to
5 the coating formulation. PFOA was added to the
6 dispersions as the ammonium salt to PFOA, ammonium
7 perfluorooctanoate (APFO)." Did I read that right?

8 A. Okay, I'm still having trouble --

9 Q. It's section 3.3 of page 2, four lines down.

10 A. Okay.

11 Q. I read the last two sentences.

12 A. Okay. Now, I found that, thank you.

13 Q. Did I read that correctly?

14 A. Yes.

15 Q. So the -- the surfactant had APFO, correct?

16 A. Yes.

17 Q. And in higher concentration as compared to
18 the dispersion, right?

19 A. Yes.

20 Q. How much more in proportion was there APFO in
21 the surfactant as compared to the dispersion?

22 A. Okay. I don't -- I don't know. I'd have to
23 go back and look.

24 Q. Is the priority source of APFO the surfactant
25 or the dispersion?

1 A. It would be the surfactant I think.

2 Q. And the APFO is in low concentration in the
3 PTFE dispersion, right?

4 A. That was my understanding.

5 Q. And your report refers to PFOA as a
6 relatively low concentration component. Isn't it
7 correct you mean APFO?

8 A. Well, again, at the pH that they would
9 likely be at, it would have disassociate -- well, it
10 would -- it would be -- again, it depends on how you
11 want to call it.

12 Q. Let's call it by its chemical name.

13 A. Okay. The -- it would be there as the
14 perfluorooctanoate. It would be there as the ion with
15 the ammonia in the solution. It would be separated as
16 ammonium ion and the PFO ion.

17 Q. You reviewed a number of MSDSes in this case,
18 right?

19 A. Yes.

20 Q. Did you review any of that identified PFOA as
21 being an ingredient as compared to APFO?

22 A. I don't think so.

23 Q. So you would agree that APFO was the
24 ingredient, not PFOA?

25 A. Yes.

1 Q. In order for PFOA to form, the pH would have
2 to be acidic, correct?

3 A. If you're really getting to the acid, yes,
4 it would have to be below somewhere between 2 and 3,
5 which is where the pK is.

6 Q. And if you really want to get to the acid,
7 that's another way of saying if you really want to form
8 PFOA, right?

9 A. Right. We may have some sloppy nomenclature
10 here.

11 Q. Meaning the use of PFOA when you meant APFO?

12 A. Or PFO really.

13 Q. PFO minus?

14 A. Right.

15 Q. If you would turn to page 3 there of your
16 expert report, Dr. Hopke.

17 A. Okay.

18 Q. At paragraph 1 -- I'm sorry. Yeah, the first
19 paragraph.

20 A. Mm-hmm.

21 Q. The last sentence of that first paragraph at
22 the third to last line, it reads "to be effective." Are
23 you with me?

24 A. Mm-hmm.

25 Q. "As a surfactant, the pH of the solution

1 would be adjusted such that the APFO would disassociate
2 to ammonium ion and PFOA"?

3 A. Mm-hmm.

4 Q. Did I read that correctly?

5 A. Yes.

6 Q. And what's the basis of your assertion that
7 the pH of the solution would need to be adjusted to be
8 effective as a surfactant?

9 A. Because if it were entirely there as the
10 PFOA, then it would not have the double -- the
11 carboxylic acid to make it amenable to interact properly
12 with the water. The idea here is that you need the
13 polar end, the carboxylic acid in order to be
14 effectively in the water and the hydrophobic end
15 deinteract with the Teflon in order to support the
16 Teflon granula in the suspension.

17 Q. Let's see if I follow. Would the pH need to
18 be adjusted to be more acidic or basic --

19 A. Basic.

20 Q. I'm sorry, go ahead -- to make the dispersant
21 solution more effective as a surfactant, more basic; is
22 that correct?

23 A. It needs to be above pH 3 to start having
24 PFO-.

25 Q. Let me see if I can finish the question and

1 see if I'm following it. Would the pH need to be
2 adjusted to be more acidic or more basic than a neutral
3 solution to make the dispersant solution to be more
4 effective as a surfactant?

5 A. Relative to a neutral solution, pH 7
6 solution, it wouldn't need to be adjusted.

7 Q. So how was the pH solution adjusted according
8 to you?

9 A. It was adjusted primarily by the amounts of
10 the dispersant relative to the amount of the water.
11 There was no -- as far as we can find, there was no
12 indication of any additions of acids or bases to
13 specifically adjust the pH.

A horizontal bar chart with 12 rows. Each row has a black square on the left, followed by a vertical line. To the right of the line are one or more black bars of varying lengths and positions. The bars are distributed across the rows, with some spanning multiple rows and others being single-row elements.

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[illegible]

[REDACTED]

8 Q. Other than those -- strike that. If APFO
9 were added to a PTFE dispersion in the form of a
10 surfactant, would you agree that the amount of APFO that
11 dissolves is dependent on the degree of dispersion?

12 A. Not necessarily if -- again, it would depend
13 on the total amount of APFO that were added relative to
14 the critical micelle-forming concentration.

15 Q. You're looking at your attorney.

16 A. I'm just seeing if he flinched too much.

17 Q. Why would he flinch?

18 A. Because we're getting into the weeds.

19 Q. Is -- let me ask it this way. Is whether or
20 not APFO dissolves at all a function of pH of the
21 dispersion?

22 A. It certainly has to have some influence but
23 at the kinds of concentrations that you would want to
24 use it for as a surfactant, you would not be adding that
25 much to get to the solubility product.

1 Q. In your report at page 3, the top paragraph,
2 four lines up, do you see where it says, "the fraction
3 of material that was in the PFOA form is a function of
4 the pH of the dispersant solution that is a mixture of
5 several dispersants and the PFT granules"?

6 A. Mm-hmm.

7 Q. Did I read that right?

8 A. Yeah.

9 Q. How about, again, for APFO, is it correct
10 that it's a function of the pH?

11 A. How much of it is APFO?

12 Q. Yes.

13 A. Yes.

14 Q. What does APFO dissolve into when it's added
15 to an aqueous solution?

16 A. Again, depends on the pH but it's going to
17 typically, you know -- most -- if the pH is over 3, it's
18 certainly going to be primarily PFO- and ammonium ion.
19 There will be some APFO in the solution.

20 Q. Is it ammonium cations NH_4^+ and PFO-?

21 A. That's what I just said.

22 Q. Did you say that?

23 A. Yeah.

24 Q. I didn't hear that. So ammonium cations,
25 NH_4^+ , right, and PFO-?

1 A. Right, but there still may be some APFOA
2 depending -- APFO depending on the pH.

3 Q. So at page 3 there, paragraph 1, that last
4 sentence again, "to be effective as surfactant, the pH
5 of the solution would be adjusted such that the APFO
6 would disassociate to ammonium ion and PFOA"?

7 A. You're meaning PFO-.

8 Q. And NH₄, right?

9 A. Right.

10 Q. NH₄+?

11 A. Right, that's the ammonium ion.

12 Q. It doesn't disassociate into PFOA, correct?

13 A. No.

14 Q. It disassociates into NH₄+ and -- strike
15 that.

16 A. It's PFO- and NH₄+

17 Q. So that's not stated correctly in this
18 report, right?

19 A. We used PFOA probably incorrectly in terms
20 of meaning the ion.

21 Q. Let's see if I can --

22 A. We really should have had three species.

23 MR. FLEMING: Mark the next exhibit,
24 which is Exhibit 7.

25 (Hopke Exhibit 7, two calculations,

1 marked for identification, this date.)

2 BY MR. FLEMING:

3 Q. There are just two calculations here,
4 Dr. Hopke. I wanted to see if you agree with it as
5 correct. We discussed that the calculation APFO as it
6 disassociates would go to NH_4^+ plus PFO^- , correct?

7 A. At the appropriate pH.

8 Q. At the appropriate pH, as a function of the
9 pH, right?

10 A. Yeah.

11 Q. And then PFO^- plus the H^+ would yield PFOA;
12 is that correct?

13 A. Yes, in equilibrium and depends on the pH as
14 well.

15 Q. Okay. That would be a two-part chemical
16 reaction, right, to get to the APFO. To get to the --
17 to get from the PFOA to APFO would be a two-step
18 reaction?

19 A. Yeah, two step.

20 Q. Those two steps are reflected in Exhibit 7,
21 right?

22 A. Yes.

23 Q. So, again, can you tell us on what basis you
24 asserted in your expert report that APFO can
25 disassociate to PFOA?

1 A. Yeah, because, again, we have information
2 that at pH 4, about 6 percent of the PFO is, really is
3 PFOA. I mean, again, it's not until you get below the
4 pK that it becomes -- moves to the fully acidic form.
5 So there's partial of acidic form and disassociated form
6 up through somewhere in the pH 4 to 6 range and I
7 haven't -- I haven't been able to find a full diagram of
8 the -- of the -- of the pH ion disassociation pattern.

9 Q. And --

10 A. But even the pK is only defined as being
11 between 2 and 3. Couldn't find a specific value.

12 Q. And I think you referred to a full diagram.
13 You couldn't find a full diagram of what the pH actually
14 is?

15 A. What the concentration of each species is as
16 a function of pH. Typically you build a concentration
17 diagram as a function of pH based on the pK of the
18 disassociating material.

19 Q. And that's an unknown variable, right, the pH
20 in this --

21 A. Yeah, it doesn't appear that -- if it's been
22 measured, it hasn't been reported in the open
23 literature.

24 Q. Before I was asking if it was correct that
25 APFO can disassociate to PFOA. It can only get there

1 through that two-step process, right?

2 A. Mm-hmm.

3 Q. It doesn't immediately disassociate to PFOA.
4 It disassociates as reflected in number 1 of that
5 calculation in front of you, right?

6 A. Right, but at a low enough pH, these steps
7 will go rapidly.

8 Q. With pH being the key there, right?

9 A. Yeah.

10 Q. Do you also agree, Dr. Hopke, that in order
11 for APFO to be emitted as PFOA from the coating tower
12 during the manufacturing process, the APFO in the
13 solution would have to acidize into PFOA, correct?

14 A. Not necessarily -- well, no, yes, it would
15 have to move to APFOA but it -- you know, the fact that
16 it can sublime at even 20 degrees C, there is mobility
17 of the hydrogen ion to the PFO- that would give you the
18 formation of the APFOA, the -- the APFO.

19 MR. FLEMING: Can you read that answer
20 back? I wasn't sure if I got it.

21 (Whereupon, the last answer was then
22 read back by the Reporter.)

23 Q. So I can ask it again. APFOA is not a
24 substance I'm familiar with.

25 A. No, it's APFO.

1 Q. Do you agree that in order for APFO to be
2 emitted as PFOA from the coating tower during the
3 manufacturing process, the APFO in the solution would
4 have to acidize into PFOA; is that correct?

5 A. Yes.

6 Q. Your Class Certification Report, if you turn
7 to page 3 -- I'll get there. That first paragraph
8 again, one, two, three --

9 A. Mm-hmm.

10 Q. -- four lines up -- strike that. I think we
11 covered that sentence. Bear with me, Dr. Hopke, I think
12 we've covered my questions on that.

13 A. Okay.

14 Q. Does -- would it affect your estimates, you
15 know, given in this case if all of the APFO in the
16 solution did not in fact convert to PFOA?

17 A. Well, then the question is where else would
18 it go? You know, as it -- again, as the solution dries
19 and you start to form solids and the solid can sublime
20 at even relatively low temperatures, then at these
21 temperatures above 100 degrees C, you're going to be
22 forming APFO -- APFO and it's going to then be able to
23 sublime.

24 So the key here is that you have a dynamic
25 process. It's not simply the PFO- in solution. As

1 you're drawing it, you're going to be changing the
2 system in a way that's going to allow it to be I think
3 converted into APFO and evaporated.

4 Q. Let me ask, Dr. Hopke, before coming today,
5 did you assume that all the APFO in the solution would
6 convert to PFOA? Did you make that assumption?

7 A. I assumed that it would be in a position to
8 be volatilized. You know, again, it's a case of, you
9 know, the question is where -- where it's going as
10 the -- as the -- as the water on the surface of the
11 fibers is evaporating and will that then -- as it dries
12 out into the solid, then it should be in a position to,
13 yes, convert to the APFO because that's where the
14 volatility will come from.

15 Q. So let me see if I can ask it and see if I
16 get it. If it's a yes or no, if it's not a yes or no,
17 explain to me, you know, what you think. But did you
18 assume that all the APFO converts to PFOA?

19 A. Yes.

20 Q. As you sit here today do you still believe
21 that to be correct?

22 A. Yes.

23 Q. Given -- why do you believe -- strike that.
24 Isn't whether it will convert from APFO to PFOA a
25 function of pH?

1 A. But the pH is changing as you're drawing it
2 and you're going to -- once you get to dried material,
3 then the sublimation mechanism comes into play.

4 Q. You don't know the pH, right; you established
5 that?

6 A. No, I don't know the pH.

7 Q. Even though you don't know the pH, how do you
8 get from APFO to PFOA without knowing the pH?

9 A. From the fact that solid will sublime by
10 exchanging a hydrogen from the ammonium ion to the PFO-
11 and producing the APFO, from the work that's been done
12 on the sublimation of the APFO.

13 Q. Seeing the DuPont Information Bulletin we saw
14 before that had the pH of 10, does that at all call into
15 question in your mind whether APFO could convert to APFO
16 (sic) at a pH of 10?

17 A. Again, as you dry the solution and you start
18 to form the solids, then pH becomes -- is no longer
19 defined, okay. If you've got a solid -- pH is only
20 there for the solution. And so you have then the
21 potential -- the additional mechanism for the mobility
22 of the hydrogen ion to form the APFO and volatilize out,
23 and the fact that it's leaving will give you a chemical
24 potential in that direction.

25 Q. Can you cite anything in the materials you

1 read that supports the opinion you just gave?

2 A. Yeah. There's certainly literature that
3 says that APF -- that it will -- you know, that it
4 sublimates.

5 Q. What's the "it," sir?

6 A. Hum?

7 Q. What's the "it" that will sublime that you're
8 referring to?

9 A. Yeah, that the APF -- that the APFOA -- APFO
10 will sublime at room temperature and, you know, it
11 doesn't provide, again, a temperature. You know, I
12 don't have the -- there's no parameters for an equation
13 to estimate what that vapor pressure would be at at 100
14 to 130 degrees but it's certainly going to be higher, so
15 there's going to be a strong movement into the
16 atmosphere.

17 Q. As you sit here today, can you identify any
18 citation that would show that APFO could convert to PFOA
19 in a solution with a pH of 10?

20 A. Not in solution. Well, again, in solution,
21 a pH 4, 6 percent of it is already APFO -- is PFOA. If
22 the pH is -- you know, now as you go higher, that
23 percentage will decrease but there still will be some
24 but the point is we're also talking about a system in
25 which we're moving from a solution to a dried material

1 and the dried material then, the pH becomes -- is no
2 longer relevant. The pH is not defined in a solid.

3 Q. So I really was focused -- I appreciate your
4 answer, thank you, but can you cite any literature that
5 would show that APFO, all the APFO, all of it could
6 convert to PFOA in a solution at a pH of 10? Can you
7 cite to any literature?

8 A. No, that will not happen.

9 Q. And if it converts to a solid, would that
10 then turn into a particulate matter?

11 A. Well, it would vaporize first and now the
12 question is what's the -- it depends on what the amount
13 in the, the air is whether it reaches supersaturation
14 and forms new particles directly or it will just attach
15 to the existing particles that are going to be there
16 naturally in the environment.

17 Q. So would you agree with me that during the
18 drying phase, all of these, the APFO doesn't convert to
19 PFOA and evaporate out of the tower? That's incorrect,
20 right?

21 A. No, I don't agree with that.

22 Q. Let me see if I can understand. Is it your
23 testimony that all of the APFO during the drying phase
24 converts to PFOA and gets evaporated or is it your
25 testimony that some of the APFO turns into a solid?

1 A. Both.

2 Q. So then I didn't ask my question clearly
3 enough. I'll let you finish explaining and then I'll
4 ask it.

5 A. As it dries into a solid, it now has the
6 ability to sublime. Okay? The hydrogen can move -- you
7 form a PF -- you form APFO, it sublimes, and you wind up
8 with an ammonia and a PFOA in the air. That's going to
9 then -- it's not likely that at these temperatures
10 you've got supersaturation but you've got existing
11 particulate matter. The air stream coming in is not
12 Hepa filtered so there are background particles that are
13 going to attach to those particles.

14 Q. So is it -- is it correct or not -- let me
15 see if I understand it. Will all of the APFO, all of it
16 in a coating solution convert to PFOA during the drying
17 phase and evaporate into the environment? Is that -- do
18 you agree with me that's incorrect?

19 A. Between the drying --

20 Q. Can you answer that question yes or no? If
21 you can't, explain.

22 A. No, I can't answer it yes or no.

23 Q. Go ahead.

24 A. I think all of the -- you know, it's my
25 belief that all of the A -- all of the PF -- all of that

1 octanoic acid between when it dries and when you now
2 start to -- you've now heated it to 100 to 200 -- 100 to
3 130 C and then you start to take it up to higher
4 temperatures as you move it towards the sintering, all
5 of that is going to then very rapidly evaporate that
6 material, sublime that material, sorry, into the
7 atmosphere and you're going to lose all of that
8 surfactant PFO as APFO into the gas stream. You're
9 going to try and move that wet air away from the fabric
10 so that the fabric effectively dries and so that's going
11 to carry that material up the stack.

12 Q. Which material?

13 A. The PFO at that point as APFO.

14 Q. Not as PFOA?

15 A. Or as PFOA, right, I'm sorry, you're right.
16 PFOA.

17 Q. I'm asking; I'm not asserting. I want to
18 know --

19 A. PFOA is where it would be in the gas phase.

20 MR. DAVIS: It might be time for a break
21 when you get to a reasonable stopping point.

22 MR. FLEMING: Let's do this one exhibit
23 and if that's all right with you, Gary, we'll
24 take a quick break after that.

25 MR. DAVIS: That's fine.

1 Q. So I'm going to hand you another exhibit,
2 Dr. Hopke.

3 (Hopke Exhibit 8, Summer 2008
4 "Measurement Partitioning, and Near-Field
5 Modeling of Perfluorooctanoate (PFO) In Air,"
6 Catherine Arundel Barton, marked for
7 identification, this date.)

8 Q. So Exhibit 8 is entitled the Measurement
9 Partitioning, and Near-Field Modeling of
10 Perfluorooctanoate (PFO) In Air by Catherine Arundel
11 Barton dated the summer of 2008. Right?

12 A. Yep.

13 Q. This is one of the documents you relied upon
14 in forming your opinions?

15 A. Yes.

16 Q. And if you turn to page 38, at table 3.1 --

17 A. Okay.

18 Q. -- do you see there, it has the near boiling
19 point for PFOA?

20 A. Mm-hmm.

21 Q. And it says it's 188 degrees Celsius?

22 MR. DAVIS: Did you mean the normal
23 boiling point? Sorry, you said near boiling
24 point.

25 MR. FLEMING: I'm sorry if I -- yeah, I

1 did misread it. Thank you, Gary.

2 BY MR. FLEMING:

3 Q. Let me rephrase it. Thank you for that
4 correction. Does it say the normal boiling point for
5 PFOA is 188 degrees Celsius?

6 A. Yes.

7 Q. Did I ask you do you agree with that?

8 A. I have no reason not to.

9 Q. You relied on that?

10 A. Yeah.

11 Q. For APFO in this table, the boiling point is
12 missing a number, right?

13 A. Yeah.

14 Q. Instead it says it decomposes, right?

15 A. Yes.

16 Q. Do you agree with that?

17 A. Yeah, but that doesn't -- never mind.

18 Q. In your expert report at Exhibit 1, if you
19 have that in front of you at page 3?

20 A. Yep.

21 Q. The third paragraph, the first sentence, it
22 says, "if the APFO did stay with the fabric to the
23 second phase of heating or the baking stage, it would
24 then vaporize from the fabric." Do you see that?

25 A. Yep.

1 Q. And you agreed earlier that vaporization and
2 decomposition are not the same thing, right?

3 A. Yep.

4 Q. So why are you asserting that APFO vaporizes,
5 in your expert report, at this stage when Barton shows
6 that it decomposes at this temperature?

7 A. Okay, because I -- okay, that's an error in
8 terms of not adequately explaining the mechanism. I
9 tried to make -- I simplified it inappropriately. Okay?

10 Again, you have this mechanism whereby as
11 you heat -- you know, it has the ability to move the
12 hydrogen ion to the -- to the PFO and produce PFOA, so
13 the decomposition is not the breakdown of the PFOA into
14 smaller components. It's the breakdown of the ammonium
15 perfluorooctanoic acid into ammonia and PFOA. That's
16 the decomposition.

17 Q. So the APFO decomposes in the drying and
18 baking phases; it doesn't vaporize, right?

19 A. The APFO doesn't vaporize but it forms PFOA
20 that does vaporize. That's what the decomposition is.
21 It's not breaking down into smaller pieces of
22 hydrocarbon. It's breaking down into ammonium and PFOA.
23 That's the decomposition.

24 Q. We discussed before that it disassociates
25 first. You have the calculation in front of you?

1 A. That's in liquid. We're talking about
2 solid.

3 Q. Okay.

4 A. Different system.

5 Q. Okay. Do you have anything you can cite that
6 would show that APFO decomposes to PFOA --

7 A. Yep.

8 Q. -- at this temperature?

9 A. At lower temperatures, which means it's
10 going to do it even more effectively here.

11 Q. Can you show me the citation?

12 A. Give me a few minutes to find the right
13 reference.

14 Q. Do you want to go off the record as you look
15 for that, Dr. Hopke?

16 A. Okay. That would be a good thing.

17 THE VIDEOGRAPHER: This is the end of
18 media unit 1. The time is approximately
19 10:59. We are off the record.

20 (A recess was then taken.)

21 THE VIDEOGRAPHER: We are on the record.
22 This is the beginning of media unit number 2.
23 The time is approximately 11:12 a.m. Please
24 continue.

25

1 BY MR. FLEMING:

2 Q. Dr. Hopke, you were looking for a citation in
3 response to my question during the break. We broke for
4 about ten minutes.

5 MR. FLEMING: How long were we on break?
6 About ten minutes?

7 THE VIDEOGRAPHER: Yeah, 12.

8 Q. 12 minutes. Can you provide the citation?

9 A. Not -- no, I didn't bring it with me. I'll
10 have to go home and find it and send it. I have the --
11 an indication of the sublimation at 25 degrees C where
12 it's got a vapor pressure of 4.2 pascals and that I can
13 provide you.

14 Q. But in response to my question --

15 A. The decomposition mechanism is in another
16 paper that I didn't print out and bring, so I'll have to
17 go find it.

18 Q. Can you identify or describe that paper to me
19 in any way, who the authors were?

20 A. I think it's in one of the Shin papers but
21 I'm not certain.

22 Q. Can you spell that for me?

23 A. S-H-I-N.

24 Q. What year?

25 A. Okay. There are two papers. One was 2008?

1 2010? They're referenced in appendix A of the Barr
2 report but it may not be those. I think that's it but,
3 you know, again, these are all things I found after.

4 Q. Okay. So you've got a few additional things
5 out in front of you. We've marked the binders but I see
6 a stack of papers and a book to your right. What is
7 that stack of papers you have to your right?

8 A. Again, other material. You know, I brought
9 the Vermont comments on the Barr report. I've got a --
10 in the Merits Report I refer to a 1970s version of the
11 Air Pollution Control Book and I just brought that along
12 in case you wanted to -- I'd rather not get that noted
13 as a --

14 Q. Yeah, we'll be able to work with you on that.
15 But I'd like to mark that stack of papers as -- how
16 would you describe the stack of papers next to you for
17 purposes of making the exhibit. Papers you brought with
18 you to the deposition for what purpose?

19 A. Just as references, as needed.

20 Q. And were these all produced to us previously?

21 A. No, these were all things I found more
22 recently.

23 Q. Oh, okay. So when I was asking before if all
24 of the materials that you considered --

25 A. In writing the report --

1 Q. Let me finish the question. All the papers
2 you considered or relied upon in forming your opinions
3 in your Class Certification Report or your Merits Report
4 that had been produced to us, is that incorrect?

5 A. No, that was correct.

6 Q. Okay. So then describe again for me, if you
7 would, what that stack is.

8 A. This was last August.

9 Q. Right.

10 A. That doesn't mean I haven't stopped looking
11 to find other things to buttress the arguments. So in
12 the interim, I have found additional material, which
13 depending on where we go, may wind up in a supplemental
14 to this report or rebutting whenever reports you
15 produce.

16 Q. Okay.

17 A. So at this point -- but it's just a matter
18 of trying to -- you know, again, we had a deadline that
19 we had to meet at the end of August and so, you know,
20 I -- at that point I relied primarily on what they
21 provided. In the interim I've done some additional
22 looking on the chemistry in order to try and be better
23 informed.

24 Q. So after you submitted your expert reports,
25 you were looking for additional chemistry papers to be

1 better informed?

2 A. Right, and again, we just got the Barr
3 report which identified a few others that I hadn't known
4 of before and hadn't been able to find.

5 Q. So in addition to all the materials that have
6 been provided to us, if I'm looking for all the
7 materials you've considered in this case, if I add that
8 stack of papers next to you, which we're going to mark
9 as an exhibit, is there anything beyond that that you've
10 considered?

11 A. Again, there are, you know, other things
12 that have come up, as I say, from the Barr report, the
13 two Shin papers. There's another one in reference to --
14 in Appendix A of the Barr report that I got.

15 Q. So before we discussed that in terms of
16 additional work you may do, you might look at that Barr
17 report from March 2018, in addition to citations within
18 it, right?

19 A. Sure.

20 Q. I'm thinking anything beyond that now. I'm
21 trying to find out anything you've considered, as you
22 sit here today, in connection with this case. You've
23 got the reliance materials, the materials you considered
24 in connection with your reports, we've got the stack of
25 materials next to you that you're flipping through now.

1 Is there anything I'm missing?

2 A. The one thing might be this one.

3 Q. We're not missing it because it's there in
4 that stack of material, right?

5 A. But I haven't previously reported it.

6 Q. Okay. So Dr. Hopke, I want to try to be
7 clear for the record, you know, so we can both try to
8 work together on this, right?

9 A. Right.

10 Q. Are you with me?

11 A. Yeah.

12 Q. Okay. I'm looking for all -- identification
13 of all the materials you've considered to date, right?
14 If we talk the reliance materials you identify in
15 connection with your Merits Report and your Class
16 Certification Report, all the other materials you
17 considered that have been produced to us, right?

18 A. Yes.

19 Q. And you take this stack of paper next to you,
20 right?

21 A. Mm-hmm.

22 Q. Is that the totality of everything or are we
23 missing other papers, other documents you've considered
24 in connection with this case or is that the totality?

25 A. Okay. There -- as I say, there are the, at

1 least three other references in the Appendix A of the
2 Barr report that I didn't print and bring.

3 Q. So we've got --

4 A. But --

5 Q. Aside from the Barr report and the citations
6 within it, is there anything else?

7 A. I don't think so.

8 Q. Okay. Fair enough. That's what I was trying
9 to get at. So if we could mark that stack of papers
10 that you have next to you as Exhibit 9. We'll put a
11 rubber band around it.

12 (Hopke Exhibit 9, additional materials
13 considered by Hopke in writing his reports,
14 marked for identification, this date.)

15 MR. DAVIS: Is there a way you can
16 describe those maybe?

17 MR. FLEMING: I think we did on the
18 record but I'm going to give Dr. Hopke a
19 rubber band and see if we captured it right.

20 BY MR. FLEMING:

21 Q. Dr. Hopke, am I correct, these are additional
22 materials you considered since you wrote your two
23 reports; is that fair?

24 A. Yes, plus some, you know, basically
25 duplicates of -- I mean, here is the text of the March

1 Barr report without the appendices. Keep my arm from
2 getting too far stretched, and a few other odds and ends
3 of things that, you know -- you know, a copy of the
4 subpoena, a copy of the -- so...

5 Q. Okay. And then, Dr. Hopke, you also have
6 underneath that a textbook. We're not going to mark it
7 so you can retain your copy. Read into the record the
8 title and the author and the date.

9 A. Right. This is Air Pollution, Its Origin
10 and Control, Kenneth Wark and Cecil Warner, one of the
11 earliest of the air pollution control textbooks.

12 Q. What is the date on it, edition, or both?

13 A. It's '74 or 5. Copyright '76.

14 Q. Does it have an edition number at all?

15 A. No, but it's the first edition because
16 there's been four editions now.

17 Q. Did you bring anything else with you to the
18 deposition beyond what we've marked or identified in the
19 form of the book?

20 A. No.

21 MR. DAVIS: Just for completion sake,
22 there are more documents on the table here.

23 A. Oh, that's right. This stuff. You know,
24 there is the -- Gary Yoder's transcript and then a set
25 of inspection reports from Vermont DEC.

1 Q. Okay. So can we mark this Yoder transcript
2 as Exhibit 10.

3 (Hopke Exhibit 10, transcript of Gary
4 Thomas Yoder, MS, marked for identification,
5 this date.)

6 A. I wanted to see what your inquisition
7 techniques were.

8 Q. I just wanted to get your opinion, Dr. Hopke,
9 and the bases for them and everything you considered.

10 A. Understood.

11 Q. And then in the binder, the binder you have
12 there would be Exhibit 11, we'll mark.

13 (Hopke Exhibit 11, ChemFab Inspection
14 Reports, 1992-2000, marked for
15 identification, this date.)

16 Q. For the binder that's Exhibit 11, are there
17 any documents in there that aren't cited in your Merits
18 Report?

19 A. We didn't cite the inspection reports
20 specifically. We pointed out that there were 11 times
21 when the inspectors came and the abaters were not at
22 proper temperature but I didn't call out which specific
23 inspection reports.

24 Q. Who selected these documents to put into this
25 binder?

1 A. Well, they were provided to me by counsel
2 but these were all of the Vermont inspection reports
3 available for the ChemFab facility.

4 Q. How do you know those are all of the
5 available inspection reports?

6 A. At least those are all the ones that are
7 available on the Vermont DEC website.

8 Q. I think we're on Exhibit 12.

9 (Hopke Exhibit 12, 2004 article by
10 Krusic and Roe, marked for identification,
11 this date.)

12 Q. Dr. Hopke, as I get to that, let me ask you
13 this. At what temperature, in your view, does APFO form
14 as a solid? At what temperature?

15 A. Well, again, we have the Barton material
16 which suggests that the melting point is somewhere in
17 the 157 to 165 range so it would be somewhere below
18 that.

19 Q. So it's below 157 to 165 degrees Celsius,
20 according to you, the temperature at which it will form
21 into a solid?

22 A. Right.

23 Q. As you sit here today, do you have any
24 further identification of that temperature beyond that
25 it's just below 157 to 165 degrees Celsius?

1 A. No.

2 Q. As you sit here today, do you know at what
3 rate APFO would form into a solid at this unspecified
4 temperature?

5 A. No, there was no rate information that I
6 found.

7 Q. So I've handed you Exhibit 12, Dr. Hopke.

8 A. Mm-hmm.

9 Q. This is a paper that's cited in your report,
10 right? It's entitled Gas -- well, let me shorten it,
11 it's by Krusic, K-R-U-S-I-C, and Roe, R-O-E, from the
12 year 2004, right?

13 A. Yes.

14 Q. And do you see in the abstract there, the
15 fourth line, it says, we find that APFO cleanly
16 decomposes by first-order kinetics to give the
17 hydrofluorocarbon 1-H-perfluoroheptane and is completely
18 decomposed (greater than 99 percent) in a matter of
19 minutes at the upper limit of this temperature range.
20 Do you see that?

21 A. Yes.

22 Q. Do you see the temperature range above it is
23 196 to 234 degrees Celsius?

24 A. Yes.

25 Q. Krusic and Roe published an equation 1,

1 right, that shows APFO converts to 1-H-perfluoroheptane
2 plus NH3 and that's at page 3802; correct?

3 A. Decarboxylate.

4 Q. That's correct? Is this equation an example
5 of first-order kinetics?

6 A. Yes.

7 Q. Is it an example of unimolecular
8 decomposition?

9 A. Yes.

10 Q. Is PFOA a component of thermal decomposition
11 in equation 1?

12 A. No.

13 Q. Can 1-H-perfluoroheptane convert quickly back
14 to PFOA?

15 A. No.

16 Q. Let's turn to page 4 of your report. The
17 first sentence there, Dr. Hopke, it says, "again
18 considering the thermal decomposition of the APFO/PFOA,
19 it is scientifically impossible for the temperature of
20 the solution to rise above the boiling point of water
21 (212 degrees Fahrenheit) until all the water is
22 evaporated, even if the zone is nominally '200 to 300
23 degrees Fahrenheit'." Do you see that?

24 A. Yes.

25 Q. Is it scientifically impossible to raise the

1 boiling point of water above 212 degrees?

2 A. Again, at appropriately higher pressures.
3 If you were above atmospheric, then you could
4 potentially have a higher boiling point but if you're
5 lower, then the boiling point will in fact go down. The
6 point is that boiling is the point at which the
7 saturation vapor pressure equals the pressure of the
8 supporting -- of the gas surrounding liquid.

9 Q. Is it scientifically impossible or not?

10 A. At atmos -- again, we're trying to explain
11 something to people without a lot of thermodynamic
12 background so at 1 atmosphere, yes, it is scientifically
13 impossible to have boiling at higher than 100 C, 212 F.

14 Q. Doesn't adding a salt to water potentially
15 raise the boiling point above 212 degrees?

16 A. Yeah, we can get into boiling point
17 elevation but again --

18 Q. Adding salt to water?

19 A. Adding salt to water will decrease the
20 saturation vapor pressure of the solution and raise the
21 boiling point; you're correct.

22 Q. And in this sentence in particular, what did
23 you mean by "the thermal decomposition of APFO/PFOA"?
24 Again, those are different chemical -- those are
25 different substances with different chemical properties,

1 right?

2 A. Right.

3 Q. They have different thermal decomposition
4 temperatures, right?

5 A. Potentially. We don't have, I don't think,
6 good data on the decomposition of either of them.

7 Q. Didn't we -- did we not --

8 A. Well, but it says decomposes but it doesn't
9 tell me what it decomposed to.

10 Q. And before, I think if I understood you
11 correctly, you didn't know the specific temperature at
12 which APFO decomposes, correct?

13 A. Right.

14 Q. I'll hand you another exhibit, Dr. Hopke,
15 moving right along. Exhibit 13.

16 (Hopke Exhibit 13, 2005 paper by Krusic,
17 Marchione, and Roe, marked for
18 identification, this date.)

19 A. Okay, yeah.

20 Q. So Dr. Hopke, this is another Krusic paper,
21 right?

22 A. Mm-hmm.

23 Q. You cited it in your Class Certification
24 Report, right?

25 A. Yes.

1 Q. This one is by Krusic, Marchione, and Roe,
2 R-O-E, and Marchione is M-A-R-C-H-I-O-N-E, right? Is
3 that right, Dr. Hopke?

4 A. Yes, that's correct.

5 Q. The paper is dated in the year 2005, correct?

6 A. Mm-hmm.

7 Q. Do you see, Dr. Hopke, on the first page in
8 the introduction, about four lines up from the bottom of
9 the left column, it says, "it has recently been shown
10 that APFO does not survive the elevated temperatures
11 (350 to 400 degrees Celsius) specified for fluoropolymer
12 processing." Did I read that right?

13 A. Yes.

14 Q. Do you have any basis to dispute that?

15 A. Yes.

16 Q. What is your basis to dispute that sentence
17 in the article you relied on?

18 A. Okay. Because in the earlier paper, 2004,
19 they did it in a glass ampule and there's the potential
20 for the glass serving as a catalyst for the enhanced
21 conversion that they're seeing. That's why in this
22 paper they used a quartz ampule to avoid any potential
23 transition metals or other potential catalytic materials
24 that might have affected it, and in fact somewhere in
25 here they say that they were concerned about how to use

1 the glass and, therefore, part of the reason for doing
2 this experiment was the potential incorrect estimation
3 of the decomposition in the earlier paper.

4 Q. Am I correct that at least according to these
5 authors, it has recently been shown that APFO does not
6 survive the elevated temperatures 350 to 400 degrees
7 Celsius specified for fluoropolymer processing? That's
8 what these researchers say?

9 A. Under the conditions in their previous
10 paper.

11 Q. Do you have any testing that supports your
12 comment that there's a potential that that result could
13 be incorrect based on the material that was used? Do
14 you have any testing that shows that?

15 A. No, I don't know -- I have not done any
16 testing. I haven't been able to find any testing.

17 Q. Dr. Hopke, if I could ask you to turn to the
18 conclusion section.

19 A. Mm-hmm.

20 Q. And do you see, Dr. Hopke, the fourth line
21 under the conclusion?

22 A. Mm-hmm.

23 Q. I'll strike it. I'll read it. Beginning
24 from the first line under conclusion, "PFOA in an
25 isolated environment is thermally quite stable up to 300

1 degrees Celsius but at higher temperatures is
2 susceptible to decomposition at increased rates via
3 heterogeneous assistance." Did I read that right?

4 A. Yes.

5 Q. Do you agree with that?

6 A. Yes.

7 Q. Next sentence reads, the half-life of PFOA at
8 307 degrees Celsius in the presence of crushed quartz
9 under our conditions may be estimated at five days,
10 whereas in the presence of crushed sodium borosilicate
11 glass, the half-life at this temperature is
12 approximately 1.3 hours. Did I read that right?

13 A. Yes.

14 Q. Do you agree with that?

15 A. That's the data they presented so, yes.

16 Q. Okay. And then moving down several lines, it
17 says -- talking about APFO, "by contrast, the pyrolysis
18 of the ammonium salt, APFO, is more facile by orders of
19 magnitude and proceeds by first-order kinetics at
20 essentially the same rates in both quartz and
21 borosilicate ampules." Did I read that right?

22 A. Yes.

23 Q. And then it says, "from the derived
24 activation parameters, a half-life of 2 seconds at 307
25 degrees Celsius is estimated for APFO." Did I read that

1 right?

2 A. Yes.

3 Q. Do you agree with that?

4 A. No.

5 Q. What methodology did you utilize to form a
6 disagreement with the authors of this paper that you're
7 relying on?

8 A. I don't think they've shown that. Okay? I
9 mean, again, the -- they have not really looked at the
10 decomposition of APFOA -- a PFOA rather, except in the
11 presence of these materials and in both cases, you know,
12 even in the case of the more catalytic borosilicate
13 glass, it was -- had a half-life of approximately over
14 an hour. So I don't think they have provided a sound
15 scientific basis for saying that it will decompose in
16 2 seconds.

17 Q. Have you cited anything to show us what you
18 view to be the rate at which it decomposes?

19 A. No.

20 Q. Have you formed -- have you studied the
21 literature on any kind of systematic basis to identify
22 the rate at which it would decompose?

23 A. I have looked extensively through the
24 literature and have been unable to find other work that
25 looks at this problem.

1 Q. And do you see the last sentence, it says,
2 "it is anticipated that most other salts of PFOA will
3 thermally decompose at temperatures substantially lower
4 than those required for the free acid." Do you see
5 that?

6 A. Mm-hmm.

7 Q. Do you have any basis to disagree with that
8 statement?

9 A. I don't know. I have not gone back to
10 references 23 -- 22 and 23 to look at those in detail
11 because, again, only the ammonium salt was involved here
12 so I didn't look at other salts.

13 Q. If we could turn back to your Class
14 Certification Expert Report, Dr. Hopke, Exhibit 1.

15 A. Mm-hmm.

16 Q. If we go back to the first page, at the sixth
17 line, there's a reference to three emission rate
18 scenarios, right?

19 A. Mm-hmm.

20 Q. It says that were used to support modeling
21 and determination of likely deposition rates, right?

22 A. Yes.

23 Q. And I think you testified earlier you did not
24 perform the modeling for PFOA air deposition in this
25 case, right?

1 A. Correct.

2 Q. Mr. Yoder did that?

3 A. Yes.

4 Q. Mr. Yoder used the program called AERMOD?

5 A. Yes.

6 Q. Why was it that Mr. Yoder did that modeling
7 instead of you?

8 A. He has considerably more expertise in
9 directly utilizing AERMOD. He has it up and running
10 routinely. He has all of the basic other data ready to
11 go so that it was much more timely to have him do the
12 modeling than for me to set it up and run it.

13 Q. And you're relying on Mr. Yoder for that
14 modeling; right?

15 A. Yes.

16 Q. You didn't form an independent expert opinion
17 on your own of that modeling; you're relying on
18 Mr. Yoder?

19 A. Yes, but, again, I've known of Gary for a
20 long time. We worked on this other prior project so I
21 had confidence that he understood the model and could
22 run it effectively.

23 Q. And you let him do that?

24 A. Yes.

25 Q. Can we agree that for any PFOA that was

1 emitted from the towers, from the ChemFab or
2 Saint-Gobain facilities, it would have been as
3 particulate matter?

4 A. No, no. I mean, most of it would be
5 particulate matter but there certainly would be at least
6 some in the vapor phase. Not a lot but most, particles.

7 Q. Can you quantify how much PFOA would be
8 released as an emission as particulate matter as opposed
9 to vapor?

10 A. Again, based on Barton, it would suggest
11 that the vast majority would be as particulate and,
12 therefore, we modeled it as an upper bounding estimate
13 to model it all as particulate.

14 Q. Modeled it all as particulate matter; is that
15 correct?

16 A. Yes.

17 Q. Do you agree that the characteristics of
18 particles in emission streams can vary substantially due
19 to operating conditions at different facilities?

20 A. Yes.

21 Q. I'd like to mark another Exhibit 14.

22 (Hopke Exhibit 14, Barr, "Process
23 Material Balance Report Glass Cloth Coating",
24 marked for identification, this date.)

25 Q. So, Dr. Hopke, do you recognize this

1 document?

2 A. Yes.

3 Q. It's a report discussing testing data relied
4 upon by Barr and in its conceptual site model, right?

5 A. Yes.

6 Q. Did you review this when coming to your
7 opinions in this case?

8 A. Not until after the report was submitted.
9 I've seen this more recently.

10 Q. Okay. So you reviewed this Exhibit 14 which
11 is entitled Process Material Balance Report Glass Cloth
12 Coating after you submitted your Class Certification
13 Expert Report?

14 A. Correct.

15 Q. And did you also review it after you
16 submitted your Merits Report?

17 A. Correct.

18 Q. When was the first time that you reviewed
19 Exhibit 14?

20 A. It would have been sometime a few weeks ago.

21 Q. And how was it that you came to get this
22 document?

23 A. Again, I had -- I recognized that we had had
24 reference to it before and so I requested it from
25 counsel.

1 Q. So it's referenced in your Class
2 Certification Report?

3 A. I don't think so.

4 Q. Okay. So when you said that you referenced
5 it, what are --

6 A. No, no, in the references that we've seen,
7 like the Barr report and things like that, so, you know,
8 I wanted to make sure that I had this and had a chance
9 to review it.

10 Q. Was it provided to you within the last few
11 weeks or did you review it previously?

12 A. Yes. I don't think I had it previously. I
13 mean, again, it could be in that collection of stuff. I
14 mean, we kept getting material and I didn't always get a
15 chance to fully review everything as it came in.

16 MR. FLEMING: I'm going to ask my
17 colleague a question.

18 (Whereupon, there was a pause in the
19 proceedings.)

20 BY MR. FLEMING:

21 Q. Dr. Hopke, let's take a look at your Class
22 Certification Report.

23 A. Mm-hmm.

24 Q. You're confident you didn't review this until
25 after your report, right?

1 A. Yeah, I think I included it as a reference
2 but I think I got that as a derivative from the Barr
3 report, without actually looking at this report, per se,
4 and that's how I -- it's in this report.

5 Q. Okay. So if you turn to page 3. Did I say
6 of your Class Certification Expert Report?

7 A. Okay.

8 Q. The second paragraph at the third-to-last
9 line.

10 A. Right.

11 Q. You see where it says, "however, the report
12 makes it clear that 'a determination' regarding
13 destruction is inconclusive for several reasons."

14 A. Mm-hmm.

15 Q. Isn't that sentence contained within
16 Exhibit 14 that you didn't review at the time you wrote
17 this paper, this report?

18 A. Yes.

19 Q. How did you come to quote a document you
20 hadn't reviewed?

21 A. I'm not sure. Again, this was last summer
22 and obviously had it from something. Maybe I had a copy
23 last summer but I don't remember having seen it so,
24 again, I know I got another copy recently and that's
25 when I -- so I'd have to go back and look and see

1 whether I actually had it before or not.

2 Q. Do you think someone else may have written
3 this sentence --

4 A. No, I wrote it but I'm not sure where I got
5 the quote.

6 Q. But as you sit here today, you don't remember
7 reading the document that you quoted until after you
8 wrote this report; is that fair?

9 A. Yes. I'm getting a little forgetful.

10 Q. If we go back to Exhibit 14 --

11 A. Okay.

12 Q. -- and again that's the Process Material
13 Balance Report for Glass Cloth Coating, right?

14 A. Yes.

15 Q. And this report measures the fate of APFO
16 during two manufacturing processes at a ChemFab facility
17 in Merrimack, New Hampshire, right?

18 A. Correct.

19 Q. And at section 2.1 of the first page, at the
20 bottom there, in the third sentence it says, "two glass
21 cloth coating processes represented the process range of
22 interest and both were sampled," right?

23 A. Yes.

24 Q. And page 2 discusses Process 1, right?

25 A. Yes.

1 Q. At the first bullet of page 2 it says,
2 "Process 1 is one of the glass cloth coating processes
3 running at the facility and is representative of
4 processes used in the industry." Did I read that right?

5 A. Yes.

6 Q. Are you aware that this ChemFab specific data
7 contained in this Exhibit 14 was compiled into an
8 industry-wide material balance report?

9 A. Yes.

10 Q. Are you aware that that industry-wide
11 material balance report is publicly available on the
12 website of the US EPA?

13 A. No.

14 Q. Did you review that publicly available
15 industry-wide material balance report in coming to your
16 opinions in this case?

17 A. No.

18 Q. So let's turn to another exhibit.

19 (Hopke Exhibit 15, Barr, "Dispersion
20 Processor Material Balance Project, Final
21 Report," February 2005, marked for
22 identification, this date.)

23 Q. So this is the Dispersion Processor Material
24 Balance Project, Final Report, right?

25 A. Yes.

1 Q. This is the industry-wide report I just
2 mentioned, right?

3 A. It appears so.

4 Q. Plaintiffs' counsel didn't provide this to
5 you?

6 A. He did not.

7 Q. You didn't ask for it?

8 A. No, I didn't know it existed.

9 Q. And, therefore, you didn't consider it?

10 A. No.

11 Q. "No," meaning, correct, you did not consider
12 it?

13 A. No, I did not consider it.

14 Q. On page 5 of Exhibit 15 --

15 A. Okay.

16 Q. -- do you see where it says The Objective Of
17 The Study?

18 A. Yes.

19 Q. It says, "the objective of the study was to
20 understand how APFO contained in AFD which is -- I'm
21 saying now aqueous fluoropolymer dispersion," right?

22 A. Mm-hmm.

23 Q. I'll keep continuing with the quote, "the
24 objective of the study was to understand how APFO
25 contained in AFD used in processing plants might find

1 its way into the environment." Did I read that right?

2 A. Yes.

3 Q. It says, "more specifically, data were to be
4 collected describing the potential contribution of
5 dispersion processing to possible environmental pathways
6 of exposure to APFO from air, water, and solid waste
7 media." Do you see that?

8 A. Yes.

9 Q. So in other words, the purpose of the report
10 was to determine how many APFO entered into the
11 environment from the coated fabric facilities; is that
12 fair?

13 A. Yes, from this fabric coating facility.

14 Q. Correct. And this -- well, strike that. We
15 discussed that a ChemFab facility in Merrimack was
16 tested with this study, correct?

17 A. Correct.

18 Q. This was a coated fabric facility, right?

19 A. Yes.

20 Q. In fact at the time this ChemFab facility in
21 New Hampshire was tested, many of the fabric coating
22 towers that were operational at North Bennington were
23 operational at that time at the New Hampshire facility,
24 right?

25 A. That's my understanding.

1 Q. Exhibit 14 contains actual mass balance data
2 from ChemFab's New Hampshire facility, right?

3 A. Correct.

4 Q. If you turn to page 7 of that report, do you
5 see where it says in the middle, underneath the table,
6 "a significant portion (87 percent) of the APFO input to
7 the process is not detected in the environmental media."
8 Did I read that right?

9 A. Yes.

10 Q. You don't remember reviewing this before you
11 provided your expert report, right?

12 A. Yes, I don't remember.

13 Q. You didn't rely on this data, therefore, in
14 your Class Certification Expert Report, right?

15 A. No, I did not.

16 Q. Do you recall how you formed any view that --
17 well, let me ask you, did you form any view as to
18 whether or not this data on destruction is inconclusive
19 or conclusive? Did you form any view?

20 A. Again, they -- I don't -- did not know the
21 details of the Merrimack plant and exactly what and
22 where they sampled and whether, in fact, they really
23 were able to fully close the loop in terms of
24 determining all of the results -- all of the resultant
25 material from the input dispersant and coating

1 materials.

2 You know, they didn't seem to look for any
3 of the byproducts and so, you know, you couldn't
4 really -- it wasn't clear to me we could be certain that
5 it really, first of all, was fully representative of
6 other plants and also whether it -- we could rely on it
7 to fully document where all of the material went.

8 Q. Did you rely on any other data from any other
9 facility in your report?

10 A. No.

11 Q. And if you turn to page 2, Dr. Hopke.

12 A. Of Exhibit 14?

13 Q. Yes, thank you. Under the sentence -- I'm
14 sorry, under the heading -- let me try that again.
15 Above the heading -- need to get my above and under
16 correct -- do you see the section where it says "Glass
17 Cloth Coating Process 2"?

18 A. Yes.

19 Q. Above that do you see the sentence that
20 begins with "because"?

21 A. Mm-hmm.

22 Q. It says, "because of these considerations, we
23 are able to determine overall Process 1 emissions to the
24 air but are not able to partition the fate of APFO
25 between the drying and sintering zones." Do you see

1 that?

2 A. Yes.

3 Q. At least according to the authors of this
4 report, they were able to determine overall Process 1
5 emissions to the air; is that correct?

6 A. That's what they report.

7 Q. But they say they were not able to partition
8 the fate between the drying and sintering zones, right?

9 A. That's what they say.

10 Q. Do you have any reason to dispute that the
11 authors believed that they were able to determine the
12 overall Process 1 emissions to the air?

13 A. No.

14 Q. Okay.

15 A. But I want to go back and check exactly how
16 they did their air sampling.

17 Q. You would have to go back and do that to
18 evaluate the actual data, right?

19 A. Right.

20 Q. To give an expert opinion on the actual
21 testing data, you would have to go back and evaluate it,
22 right?

23 A. Yes. Some stack sampling systems are not as
24 effective as they could be.

25 Q. As you sit here today, you don't know if

1 this -- if this sampling or testing falls into that
2 category or not because you haven't evaluated it, right?

3 A. That's correct.

4 Q. If we could go back to Exhibit -- sorry,
5 yeah, Exhibit 15, at page 49, so this is the
6 industry-wide Dispersion Processor Material Balance
7 Project Final Report that's available on the EPA website
8 that we discussed before, right?

9 A. Yes.

10 Q. Okay. So if we could go to page 49 of that
11 report, Dr. Hopke.

12 A. Mm-hmm.

13 Q. The second-to-last paragraph above number 2
14 towards the bottom, there's a paragraph that begins "a
15 significant amount." Do you see that?

16 A. Yes.

17 Q. Do you see where it says, "a significant
18 amount of the APFO input to the glass cloth process
19 decomposes."

20 A. Yes.

21 Q. Do you see later -- I'm sorry, earlier, above
22 that, in the first full paragraph it says, "the APFO
23 detected in the air exhaust from the oven ranges from
24 9 to 19 percent for sampled processes." Do you see
25 that?

1 A. Yes.

2 Q. And again, this is not data that you relied
3 on or considered before compiling your expert reports,
4 correct?

5 A. That's correct.

6 Q. As you sit here today, you can't offer an
7 expert opinion on the reliability or lack of reliability
8 of that data because you haven't evaluated it?

9 A. That's correct.

10 Q. If we could go to page 3 of your Class
11 Certification Report, Dr. Hopke, Exhibit 1, seven lines
12 from the top there's a sentence that says, "general
13 industry practice would be for the plant to be designed
14 to rapidly move the moist air away from the dryers so
15 that the water on the fabric could rapidly evaporate."
16 Do you see that?

17 A. Yes.

18 Q. I didn't see any citation to the source of
19 your view of "general industry practice." Can you tell
20 us your basis for opining on the general industry
21 practice?

22 A. Just the basis of how you typically would do
23 separations. You want to -- you know, this air is going
24 to have a high humidity. If you want to then dry the
25 fabric, you want to get that moisture away so that you

1 have a greater driving force for the water into the
2 drier air. So, I mean, this would -- this is just basic
3 of what one does in any kind of drawing process.

4 Q. Did you speak to anybody in the industry to
5 support your view as to what the general industry
6 practice was?

7 A. No, but, again, in terms of knowing, you
8 know, and being involved in teaching separations, one
9 does that in terms of trying to separate -- separate
10 materials so that the process can be effective.

11 Q. Can you identify for me the different
12 companies that are in this industry?

13 A. Almost any industry that's going to be
14 drawing in materials so that if you're heating things
15 to -- you know, paper or other kinds of industries where
16 you're trying to take something that's wet and dry it,
17 you're going to try and move dry air over it and move
18 the now wet air away from your product so that you keep
19 moving material from the product into the air.

20 Q. What industry were you referring to when you
21 referred to general industry practice?

22 A. Just general kinds of, you know, separations
23 that one does in general. I wasn't thinking of any
24 specific industry but, again, you know, the way you dry
25 something is to get the processed air that's now being

1 more saturated with water away from your product and
2 bring in or do something to try and make sure that
3 you're minimizing the potential or slowing down the
4 transfer, the mass transfer from the product into the
5 supporting air.

6 Q. If someone said, you know, I just want to
7 test Dr. Hopke's view as to what the general industry
8 practice was, can you cite me to any literature or any
9 document or any textbook that would describe the general
10 industry practice that you opine on in your report here?

11 A. I'm sure I could find it but I don't have it
12 handy at the moment.

13 Q. Would you be able to find it within the
14 materials that you have with you here today?

15 A. No, definitely not.

16 Q. Would it be within the materials that were
17 produced to us in this case?

18 A. No.

19 Q. Where would it be?

20 A. I'd have to go back and look at separations
21 textbooks and things like that and, as I say --

22 Q. You haven't done that for this report?

23 A. No, I didn't do it specifically, because as
24 I say, I taught a separations course before so I didn't
25 go back and look.

1 Q. If we could go back to the Barton paper.

2 A. The Barton thesis?

3 Q. Yes, the Barton thesis and on that point,
4 this Barton thesis is just that; it's a thesis, right?

5 A. Right or a couple of papers that have been
6 published derived from.

7 Q. This thesis itself was not published in the
8 peer-reviewed literature, correct?

9 A. No.

10 Q. But you're relying on this thesis, right --

11 A. Right.

12 Q. -- for your opinions here?

13 A. Right, because, again, there are the three
14 papers that are -- at least two and I thought three
15 papers that have been published based on the thesis.

16 Q. Did you cite those two or three papers in any
17 of your reports?

18 A. No, because it was all in the --

19 Q. So you're not relying on those papers?

20 A. Again, they're not different than what's in
21 the thesis.

22 Q. You're relying on the thesis? If I want to
23 find what you're relying on --

24 A. Right. It was the comprehensive summary of
25 all the work she had done.

1 Q. So on page 40, thank you, Dr. Hopke, it says,
2 about seven lines up from the bottom, "it is important
3 to note that among APFO, PFO- and PFOA, only PFOA is
4 likely to exist in appreciable amounts as a vapor, as a
5 solid, and in aqueous solution under normal
6 environmental conditions." Did I read that right?

7 A. Yes.

8 Q. What's your understanding of what "normal
9 environmental conditions" are in that statement?

10 A. It would typically be 1 atmosphere pressure,
11 20 degrees Celsius, normal composition atmosphere.

12 Q. And the Barton thesis that you relied on does
13 not analyze the extent to which PFOA decomposes during
14 different stages of the coated fabric process, does it?

15 A. No, it does not.

16 Q. Dr. Hopke, can we agree that Barton's data
17 are derived from a PTFE dispersion facility in West
18 Virginia?

19 A. That's correct.

20 Q. As you sit here today, you don't have any
21 basis to say that dispersion manufacturing facility in
22 West Virginia is representative of ChemFab's or
23 Saint-Gobain's coated fabric processing operations in
24 Vermont, do you?

25 A. Not directly but, again, some of the

1 processes that would be occurring in terms of attachment
2 to particles and other sorts of related information
3 would be relevant to the ChemFab facility.

4 Q. So if I understood you previously, I think in
5 considering the actual test data from the coated fabric
6 facility in New Hampshire, that you hadn't read the
7 report on, before you issued your Class Certification
8 Report; you questioned whether it would be
9 representative of the operations in Vermont, right?

10 A. That's correct.

11 Q. Did you raise the same question in your mind
12 as to whether or not a different manufacturing process
13 of a different company would be representative of
14 ChemFab's Vermont operations?

15 A. No, I knew this was not representative of
16 the fabric coating facility.

17 Q. But you relied on it?

18 A. Well, again, I relied on some of the
19 physical chemistry that she derived from her studies and
20 for some of the characteristics of the dispersions from
21 the plant which are not dependent on what the nature of
22 the plant operation were.

23 Q. Would the coated fabric operations data from
24 New Hampshire be more representative or less
25 representative of the Vermont operations of ChemFab and

1 Saint-Gobain as compared to the PTFE manufacturing
2 operational data?

3 MR. DAVIS: Objection to the question as
4 vague.

5 Q. Do you have an opinion on that?

6 MR. DAVIS: I objected so you can answer
7 now.

8 A. Okay. It would certainly be more relevant
9 to the ChemFab facility in Vermont.

10 Q. What is the it that you're referring to, the
11 New Hampshire data?

12 A. I don't know the exact configuration. I
13 don't particularly know the configuration of the venting
14 system, of the other -- you know, I don't know the
15 details of the plant layout in a way that would allow me
16 to make a more direct comparison with the ChemFab
17 facilities.

18 Q. What I was understanding you to say, "it
19 would certainly be more relevant" than the PTFE
20 manufacturing facility, you mean the New Hampshire
21 testing data would be more relevant to Vermont
22 operations than the PTFE manufacturing data; is that
23 correct?

24 A. Yes, although, again, I'm not relying on the
25 in-plant information. I'm relying on the other

1 information that you derived -- that gave more basic
2 properties of these materials in the environment.

3 Q. You're saying that you don't know sort of the
4 venting of the New Hampshire facility as compared to the
5 Vermont facility?

6 A. That's correct.

7 Q. Do you know the venting of the PTFE facility
8 as compared to the Vermont facility?

9 A. No.

10 Q. I think you said you don't know the details
11 related to the plant layout of the New Hampshire
12 facility compared to the Vermont facility, right?

13 A. That's right.

14 Q. Do you know the details of the PTFE facility
15 compared to the Vermont facility, of the layout?

16 A. No.

17 MR. FLEMING: This would be a good time
18 to take a quick break. What time do we have?

19 THE VIDEOGRAPHER: The time is 12:11.

20 This is the end of media unit 2.

21 (Whereupon, a recess was then taken.)

22 THE VIDEOGRAPHER: We are on is the
23 record. This is the beginning of media
24 number 4, the time is approximately 12:20,
25 please continue.

1 (Hopke Exhibit 16, e-mail chain,
2 6/23/17-6/25/17, marked for identification,
3 this date.)

4 BY MR. FLEMING:

5 Q. We're back on the record, Dr. Hopke. Are you
6 ready to go?

7 A. Yeah.

8 Q. So we've marked Exhibit 16, Dr. Hopke, that
9 you have in front of you, right?

10 A. Yeah.

11 Q. It's an e-mail chain dated June 24 -- I'm
12 sorry, June 23, 24 and 25, 2017, right?

13 A. Mm-hmm.

14 Q. And it's between you and Catherine Dare and
15 Gary Yoder, right?

16 A. That's correct.

17 Q. And in the initial e-mail there's an e-mail
18 from a Edward Hinchey to Catherine Dare, right?

19 A. Yes.

20 Q. Who is Edward Hinchey?

21 A. He's, I think, Gary's partner but I'm not
22 positive. I'm not sure who IC Environmental is. I
23 don't know at this point definitely.

24 Q. And do you see where this Mr. Hinchey
25 attaches the paper by Barton, provides them to Catherine

1 Dare?

2 A. Yes.

3 Q. Then does Catherine Dare forward them to you
4 and Mr. Yoder?

5 A. Yes.

6 Q. Before I think you testified that you thought
7 you obtained the Barton paper on your own. Does this
8 refresh your memory as to whether or not you got it on
9 your own or it was provided by Cathy Dare?

10 A. Both.

11 Q. And which came first?

12 A. I think I found them first but I was looking
13 at them for the aerosol gas partitioning and not for the
14 particle size information or the AERMOD information.

15 Q. And at the top of this e-mail chain,
16 Dr. Hopke, is the e-mail from you, right?

17 A. Correct.

18 Q. And in the second line, do you see the
19 sentence that says "I need"?

20 A. Mm-hmm.

21 Q. This is referring to the Barton thesis from
22 2008, right?

23 A. Correct.

24 Q. And you say, "I need to go through this in
25 more detail but the plant they were studying was to

1 produce the PFOA so the emissions would be quite
2 different than the ChemFab plant in the terms of
3 co-emitted PM." Did I read that right?

4 A. Yes.

5 Q. PM stands for particulate matter, right?

6 A. Correct.

7 Q. Do you still believe, as you sit here today,
8 that the plant they were studying was to produce PFOA so
9 the emissions would be quite different than the ChemFab
10 plant?

11 A. Potentially. Again, we don't know what the
12 size distribution inside the, either plant were and so
13 the question is what's the appropriate size distribution
14 to use for modeling.

15 Q. Okay. Let's see if I could get my best
16 understanding of your testimony on this question. As of
17 June 25th, 2017, you wrote that the emissions would be
18 quite different than the ChemFab plant in terms of
19 co-emitted particulate matter, right?

20 A. Mm-hmm.

21 Q. Do you still believe that today or no?

22 A. Could be. I mean, again, we don't really
23 know -- we have -- all we have are fence-line data in
24 West Virginia. We don't have stack distributions in
25 West Virginia. We don't have stack size distributions

1 in Bennington, so the question is how much of the PM at
2 that fence line is coming from the plant versus how much
3 is background aerosol that's there to which then the
4 material has attached and, you know, the problem we have
5 then is that we have to use something that is reasonable
6 for the modeling of the dispersion and deposition into
7 the surrounding community and so we have used the Barton
8 as has -- as my understanding has have Barr and as has
9 Vermont DEC as our best estimate.

10 Q. So you give a pretty -- let me see if I can
11 narrow my question and see if I have it right. As you
12 sit here today, you believe that the emissions could be
13 quite different than the ChemFab plant in terms of
14 co-emitted particulate matter. Is that your view?

15 A. Yes.

16 Q. We're referring to this plant down in West
17 Virginia that made PTFE that's referenced in the Barton
18 paper, right?

19 A. Correct.

20 Q. Thesis, right?

21 A. Correct.

22 Q. And did you go through this issue in more
23 detail after June 25th, 2017?

24 A. Yes.

25 Q. And what was it that caused you to change

1 your view that as of that time the emissions would be
2 quite different to sitting here today you believe they
3 could be quite different?

4 A. Again, given the fact we have no data within
5 the plant, the best we could do was to assume that the
6 fence-line data that Barton took is a reasonable
7 estimate of dynamics of particle -- of partitioning of
8 the perfluorocarbon onto particles and, therefore,
9 reasonable to use as at least a good estimate for the
10 dispersion modeling and, as I say, this was then done by
11 all of the other parties involved in trying to do the
12 dispersion modeling.

13 Q. So Dr. Hopke, again, it's your view that the
14 emissions from that West Virginia plant could be quite
15 different from the ChemFab facility, right?

16 MR. DAVIS: Object to the question; it's
17 vague.

18 A. I mean, again, I think we've answered that
19 multiple times.

20 Q. But if you could work with me, I'm not sure I
21 understand it. Am I correct or not, and we can see if
22 we can move on, that the emissions from this West
23 Virginia paper referenced -- I'm sorry, strike that.

24 The emissions from the West Virginia plant
25 referenced in the Barton thesis could be quite different

1 than the ChemFab plant in terms of co-emitted
2 particulate matter; is that fair?

3 MR. DAVIS: Objection.

4 A. Yes.

5 Q. Okay. As you sit here today, can you say
6 with any reasonable degree of scientific certainty that
7 the emissions from the West Virginia plant were
8 representative of the emissions from the different plant
9 of ChemFab and Saint-Gobain in Vermont? Can you say
10 that?

11 MR. DAVIS: Objection to form.

12 A. I can't say one way or the other.

13 Q. Okay.

14 A. I would need measured data.

15 Q. And who is Cathy Dare again?

16 A. Hum?

17 Q. Who is Cathy Dare again? Could you remind
18 me?

19 A. She's managing partner of TRM.

20 (Hopke Exhibit 17, 8/30/99 letter,
21 Prohaska to Jones SGPPLVT13001769-772, marked
22 for identification, this date.)

23 Q. So, Dr. Hopke, I've handed you what's been
24 marked as Exhibit 17 and was this document cited in your
25 Class Certification Report?

1 A. I think so. I think this is the one.

2 There's one, Prohaska.

3 MR. DAVIS: Do you want him to look at
4 all the documents he cited to make sure?

5 MR. FLEMING: I was actually asking but
6 on the citations page it appears to be a
7 different cover letter --

8 THE WITNESS: I think we may have put
9 the wrong one in.

10 BY MR. FLEMING:

11 Q. I really, just to be clear, Dr. Hopke, I was
12 asking the question, so it's not cited under citations
13 at page 8 of your report, at number 5 it's not cited?

14 A. No, it's not.

15 Q. Did you review this document that I've handed
16 you that's Exhibit 17?

17 A. Yeah, although I looked more at the actual
18 TRC report.

19 Q. And what I've handed you is an August 30th,
20 1999 letter from Robert Prohaska to Chris Jones of the
21 Vermont Agency of Natural Resources, right?

22 A. That's correct.

23 Q. And this is Exhibit 17, right?

24 A. Yes.

25 Q. If you turn to the Summary of July 1999 Stack

1 Testing at ChemFab, North Bennington, Vermont, do you
2 see that page with the table?

3 A. Yes.

4 Q. It's the Bates ending in 1770, right at the
5 bottom?

6 A. Correct.

■ ■ [REDACTED]

■ [REDACTED]

■ ■ [REDACTED]

■ ■ [REDACTED]

■ [REDACTED]

■ [REDACTED]

■ ■ [REDACTED]

■ ■ [REDACTED]

■ ■ [REDACTED]

■ ■ [REDACTED]

■ ■ [REDACTED]

■ ■ [REDACTED]

■ [REDACTED]

■ [REDACTED]

■ ■ [REDACTED]

22 Q. Do you have any basis to believe, Dr. Hopke,
23 that the rate of particulate matter emissions was
24 greater with the abater on than it was with the abater
25 off?

1 A. There is the potential, given the
2 ineffective sampling system for condensable material
3 used here. They're using standard EPA methods which are
4 right by regulation but are not the state-of-the-art
5 science.

6 Q. If I understand you correctly, you believe
7 there's a potential that this data could be --

8 A. Underestimated.

9 Q. -- underestimated because of that, right?

10 A. Yes.

11 Q. As you sit here today, can you say with any
12 reasonable degree of scientific certainty that that
13 potential actually exists?

14 A. No, I can't say for certain.

15 Q. It's a hypothesis that you are not able to
16 prove; is that fair, as you sit here today?

17 A. All right. On the basis of other
18 measurement systems, it's clear that appropriate
19 dilution sampling, dilution and cooling sampling could
20 wind up -- could produce higher concentrations than are
21 measured with the standard EPA trains.

22 Q. That's why you believe there's a potential
23 that this could be underestimated?

24 A. Yes, I think there's a strong potential.

25 Q. "There's a strong potential." But, again, as

1 you sit here, you can't say with any reasonable degree
2 of scientific certainty that that potential, strong
3 potential actually exists; is that correct?

4 A. Not without measurements.

5 Q. Is PFOA thermally decomposed faster in the
6 presence of a transition metal catalyst as you state at
7 page 3 of your report?

8 A. I believe that the Krusic data suggests,
9 strongly suggests that because that's the likely
10 component of the glass that would make it different than
11 the quartz.

12 Q. Is the TORVEX catalyst that's referenced in
13 your report based on a transition metal catalyst?

14 A. No, I think it's a noble metal catalyst but
15 I'd have to go back and look.

16 Q. Have you heard that it's platinum?

17 A. Yeah, that's what I thought it was, which is
18 not a transition metal.

19 Q. Was the TORVEX catalyst in the abater
20 operated at temperatures sufficient to result in the
21 thermal decomposition of PFOA?

22 A. We don't know. I mean, there were at least
23 11 times when there were Vermont inspections where the
24 catalyst was not operating at the required temperature.
25 There's no detailed in-plant report of what those

1 temperatures are so we are not -- we're not able to know
2 if the abaters were going to be operating effectively.
3 We do know that there were times when they got silicon
4 coated and became quite ineffective. There were still
5 odor complaints after the abaters were in place,
6 indicating that they were not functioning adequately.
7 So there certainly is strong evidence that the abaters
8 were not fully functional.

9 Q. And what sort of scientific methodology did
10 you utilize to determine that the -- those abaters were
11 not operating at that temperature?

12 A. I took the Vermont inspection report numbers
13 and the fact that there were still a number of odor
14 complaints during that time and if the -- and there are
15 also internal memos that indicated that there were
16 issues with regard to in deactivation of the catalyst,
17 which we discuss in the merit report.

18 Q. Did you ask Plaintiffs' counsel if there are
19 any documents produced in the litigation that may have
20 shown the temperature at which the abater was operating?

21 A. Yes.

22 Q. And what did they tell you?

23 A. That all we had was the inspection reports.

24 Q. They told you all that they had was the
25 inspection reports for what?

1 A. For the times when -- okay, in other words,
2 there were no -- as far as I understood, there were no
3 recorded abater temperatures taken by the ChemFab
4 personnel or at least not that we're aware of. The only
5 data we have on the abater temperatures are when Vermont
6 DEC was making inspections. Those appear in the
7 inspection reports but that's the only specific data we
8 have on temperature.

9 On the other hand, the fact that there were
10 still odor complaints would suggest -- would strongly
11 suggest that the abater was, not fully functional
12 because if it was it should have destroyed the odor
13 components.

14 Q. You didn't -- you testified earlier you
15 didn't ask for or receive all of the documents that
16 Saint-Gobain produced in this litigation, correct?

17 A. No, I didn't --

18 Q. That's correct?

19 A. That's correct.

20 Q. So, therefore, you didn't do an independent
21 review of all of the documents that Saint-Gobain
22 produced in this litigation to make a conclusion about
23 that, right?

24 A. No, but I asked if there were any other data
25 on abater temperatures and was led -- was told that all

1 we had was the Vermont DEC reports.

2 Q. I'll try to clarify, when you said "was told
3 that," you were told by Plaintiffs' counsel; right?

4 A. That's correct.

5 Q. If we could turn back to your Class
6 Certification Report at page 4, Dr. Hopke. I'm going to
7 ask you about the last paragraph above section 3.5. Do
8 you see that paragraph beginning with "however"?

9 A. Yes.

10 Q. And in the middle there, at the third line,
11 it refers to a "unit emission rate approach" being used,
12 right?

13 A. Yes.

14 Q. So a unit emission rate approach was used to
15 model PFOA air deposition from the former ChemFab
16 facilities; right?

17 A. Yes.

18 Q. What does that mean?

19 A. Well, that means we looked at the --

20 Q. If I could just interrupt, forgive me for
21 doing it, when you say "we" --

22 A. Me.

23 Q. You do mean -- if you could try to be as
24 clear as you can about that.

25 A. I'm sorry about that.

1 Q. I understand that's the way you think, but it
2 would be helpful for the record to try not to say "we"
3 when you mean you, and be as clear as to who --

4 A. I understand. I will try and do that.

5 Q. I'd appreciate that.

6 A. Okay. So what I did was look at the process
7 lines and try to then aggregate the total amount of
8 material based on what we had in terms of records of
9 material and those also were summarized in some of the
10 other material we had and then used the total amounts of
11 input material as a way of trying to then estimate the
12 aggregated emission rates.

13 Q. And the three emission rates referenced in
14 this paragraph are 100 pounds per year, right, 1,000
15 pounds per year, and 10,000 pounds per year?

16 A. That's correct.

17 Q. As you sit here today, can you say with any
18 reasonable degree of scientific certainty which one of
19 these scenarios, if any, accurately reflects actual
20 emissions?

21 A. I'm very much convinced it's got to be
22 somewhere between 1,000 and the 10,000. The 100 is sort
23 of basically Barr estimate. 1,000 is Barr corrected for
24 decomposition which is what Vermont DEC did and that
25 gave them something like 1,300 pounds per year. If we

1 also include the inability of the abaters to effectively
2 remove it, that gets us up to 2,400, 2,500 pounds per
3 year.

4 If we take the data from if 2001
5 spreadsheets that we got, which were used to help
6 prepare the temporary permit application for Merrimack,
7 then one can, depending on whether the plant was running
8 24/7 or only 5 days a week, we had something between
9 7,000 and 10,000 pounds per year.

10 Q. So can you say with any reasonable degree of
11 scientific certainty where in between the 1,000 and
12 10,000 pound per year estimate actual emissions would
13 fall?

14 A. Not with any scientific certainty. I mean,
15 I think we can say they're certainly in 1,000 to 10,000
16 and likely more at the high end than the low end.

17 Q. So what's your methodology, if you want to
18 test that and try to replicate it, for saying that it's
19 more likely to fall at the high end as compared to the
20 low end? Have you calculated the probability in your
21 view or possibility in your view of where those
22 estimates fall compared to what you think actual
23 emissions are between 1 and 10,000?

24 A. I don't see any way to do that.

25 Q. If we wanted to find out -- if we wanted to

1 test your theory there, that it's in your view more
2 probable that it's on the higher end in that 1 to 10,000
3 range, we wouldn't have any calculation that we could
4 utilize to say, yes, we can replicate Dr. Hopke's view
5 that it's more likely on the higher range; is that fair?

6 A. The one possibility would be to try and use
7 the distribution of material out in the domain, estimate
8 what the total deposition was and then do some inverse
9 modeling.

10 Q. You haven't done that, right?

11 A. No.

12 Q. And that would be a way of testing your
13 conclusion after you just offered the conclusion, right?

14 A. Potentially. I mean, it's --

15 Q. It wouldn't be a way of developing your
16 conclusion based on a test?

17 A. No.

18 Q. It would be a way of trying to support your
19 conclusion after it was offered with a test that you
20 haven't done, right?

21 A. Correct, but we also then can potentially
22 compare the amounts that were seen out there based --
23 with the deposition calculations and that again helps to
24 support what the likely emission rates were.

25 Q. I appreciate that. Again, you haven't done

1 that, right?

2 A. Right.

3 Q. If we could turn to the second paragraph of
4 page 4, it says, the Barr conceptual model used
5 information about the annual purchase of dispersions and
6 assumptions about the concentration of PFOA in the
7 dispersions, destruction of PFOA in the ovens, and
8 removal of PFOA by the abaters to estimate PFOA
9 emissions were on average -- were an average of 145
10 pounds per year, (minimum 16, maximum 307.) Did I read
11 that right?

12 A. That's correct.

13 Q. And you disagree with Barr's conclusion on
14 that average?

15 A. Yes, because I don't believe that there was
16 the thermal destruction or the abater destruction that
17 she includes.

18 Q. And you state that, if you go to your
19 Declaration, let's see, which I believe is Exhibit 2.
20 Did you find your Declaration?

21 A. Yes, I have it.

22 Q. I'm going to ask a question about paragraph
23 9. Let me see if I can work through it this way.
24 Dr. Hopke, at paragraph 9 at page 5, are you there?

25 A. Mm-hmm.

1 Q. It says you disagree with the following Barr
2 assumptions, right?

3 A. Correct.

4 Q. You say which greatly reduce the PFOA
5 emissions, right?

6 A. Yes.

7 Q. One says PFOA destruction in the towers; two
8 says destruction of PFOA in air pollution control
9 devices, and three says assumption of a PFOA
10 concentration of 2,000 parts per million in the
11 dispersions used, right?

12 A. Mm-hmm.

13 Q. Your Declaration states that "my estimate,
14 based on the Saint-Gobain dispersion usage numbers" --

15 MR. DAVIS: Where are you reading from?

16 MR. FLEMING: Paragraph 10, sorry, also
17 page 5.

18 A. Paragraph 10.

19 Q. "Based on the Saint-Gobain dispersion usage
20 numbers, with no destruction of PFOA in the towers or
21 air pollution control devices and using PFOA
22 concentrations from Material Safety Data Sheets provided
23 by dispersion manufacturers, is that annual average PFOA
24 emissions from the Northside Drive Plant (1968 to 78),
25 would have been over 1,000 pounds per year and over

1 7,000 pounds per year for the Water Street plant (1978
2 to 2001);" right?

3 A. Correct.

4 Q. It goes onto say that "the 7,000 pound per
5 year estimate for the Water Street plant is similar to
6 an estimate made by Saint-Gobain in 2001 in a
7 spreadsheet prepared for permitting of the towers moved
8 to the Merrimack, New Hampshire plant in 2001"?

9 A. That's correct.

10 Q. Can you say to any reasonable degree of
11 scientific certainty that this 7,000 and 1,000 pound per
12 year estimate accurately reflects actual emissions?

13 A. Not with absolute certainty. Again, without
14 measurements, you know, all we can do is make reasonable
15 estimations.

16 Q. Can you say not to absolute certainty but to
17 any reasonable degree of scientific certainty that the
18 1,000 pound and 7,000 pound estimates here accurately
19 reflect actual emissions from these two plants?

20 A. I think so.

21 Q. And if we wanted to now test how you came to
22 this scientific view that 7,000 pounds accurately
23 reflects actual emissions from the North Bennington
24 Water Street plant and 1,000 pounds from the Northside
25 Drive plant, how do we do that?

1 A. Well, as we discussed a couple minutes ago,
2 the only thing we could potentially do is to look at the
3 measured concentration patterns, try and estimate what
4 the total deposition was over time and, therefore,
5 calibrate the dispersion model or do inverse modeling to
6 try to get the total emission rates.

7 Q. I see. That is the testing that has not been
8 done, correct?

9 MR. DAVIS: I'm going to object to the
10 question.

11 MR. FLEMING: You can object to the
12 form.

13 MR. DAVIS: I object to the form because
14 he was clearly misled but go ahead.

15 MR. FLEMING: You can object to the
16 form. There's no misleading.

17 Q. Did you find anything misleading about any
18 question I asked you?

19 A. I don't know. I'm not into the details of
20 leading and misleading.

21 Q. As far as you're concerned, you're not aware
22 if you were not misled. So I'm not trying to ask any
23 kind of misleading question. I'm just asking you about
24 the testing that I believe you were describing that you
25 said could be done, right, to try to verify or test your

1 view, right? And my question was that testing has not
2 been done, right?

3 A. That's correct.

4 Q. Does this emissions estimate depend on the
5 conclusion that all PFO that was in the dispersion and
6 the surfactant converted to PFOA?

7 A. Yes.

8 Q. Does it depend on the conclusion that
9 absolutely no PFOA is destroyed during the coating
10 fabric process?

11 A. Yes.

12 Q. If any APFO is not converted to PFOA, that
13 would affect your estimate, right?

14 A. Yes.

15 Q. In fact less PFOA would be less to emit,
16 right?

17 A. Correct.

18 Q. If any PFOA is destroyed during the coated
19 fabric process, your emissions estimate would be
20 affected also, correct?

21 A. Correct.

22 Q. You would overestimate if in fact there were
23 some PFOA that was destroyed during the coated fabric
24 process, correct?

25 A. That's correct.

1 Q. Your emissions estimate also depends on the
2 conclusion that the catalytic abaters used, like by
3 ChemFab at both of its former facilities at Vermont
4 captured absolutely no PFOA emissions, correct?

5 A. That's correct.

6 Q. If the catalytic abaters captured or
7 destroyed any PFOA, your estimate would be affected,
8 correct?

9 A. Correct.

10 Q. Your estimate would overestimate actual
11 emissions if in fact the catalytic abater captured and
12 destroyed at least some PFOA, right?

13 A. Correct.

14 Q. You then say in your report, it's at page 4
15 of your Class Certification Report, it's the third
16 paragraph, the fourth line.

17 A. Mm-hmm.

18 Q. It says, "if concentrations of APFO in
19 dispersions were taken from Material Safety Data Sheets
20 instead of the 2,000 part per million concentration
21 assumed by Barr, the annual emissions would have been
22 over 1,000 pounds per year for the Northside Drive plant
23 for 1969 to '77, and over 7,000 pounds per year for the
24 Water Street plant for '78 through 2001"; right?

25 A. That's correct.

1 Q. Do we have the exhibit --

2 MR. DAVIS: Can we wrap up after this
3 series of questions, please?

4 MR. FLEMING: Yes, certainly.

5 (Hopke Exhibit 18, Barr 2017 "Draft
6 Conceptual Modeling of PFOA Fate and
7 Transport: North Bennington, Vermont,
8 Prepared for Saint-Gobain Performance
9 Plastics", marked for identification, this
10 date.)

11 BY MR. FLEMING:

12 Q. I'll hand you another exhibit, Exhibit 18.
13 I've handed you what's been marked as Exhibit 18,
14 Dr. Hopke and it's entitled Draft Conceptual Modeling of
15 PFOA Fate and Transport: North Bennington, Vermont,
16 Prepared for Saint-Gobain Performance Plastics by Barr
17 dated June 2017, right?

18 A. Correct.

19 Q. Did you consider this document --

20 A. Yes.

21 Q. -- in forming your opinions?

22 A. Yes.

23 Q. Thank you. If you turn to page 21, about
24 eight lines up from the bottom -- I'll give you a second
25 to get there.

1 A. The pages were stuck together. There you
2 go. Okay. How many lines up from the bottom?

3 Q. Eight lines up from the bottom of page 21?

4 A. Okay.

5 Q. It says, "based on operational data at a
6 similar facility in Merrimack, New Hampshire, an
7 estimate of PFOA content in the dispersions used in the
8 coating process of 2,000 parts per million (for high
9 PFOA content dispersions) were applied to annual
10 dispersions usage data and measured air emissions data
11 to estimate annual PFOA emissions." Did I read that
12 right?

13 A. That's correct.

14 Q. It says, "Many different dispersions were
15 used at both facilities and not all dispersions
16 contained PFOA." Do you see that?

17 A. Yes.

18 Q. What methodology did Barr utilize to estimate
19 PFOA content of 2,000 parts per million for high-content
20 PFOA dispersions?

21 A. It's my understanding it was MSDS.

22 Q. What's the basis for your understanding?

23 A. I thought that's what I read but it's been a
24 long time since I read this in detail. I've been
25 looking primarily at the appendixes.

1 Q. And do you disagree with that conclusion of
2 Barr?

3 A. Yeah. There was evidence that there were
4 some dispersions with up to 5,000 ppm of the PFOA and
5 there were also indications that at times -- well, and
6 so there's certainly strong indication that there may
7 be -- there was more material than would have been in
8 the straight dispersions. The dispersions evolved over
9 time and it's not clear they were entirely uniform over
10 the whole period of the operation in Bennington.

11 Q. Was Barr right that not all dispersions
12 contained PFOA or APFO?

13 A. Yes.

14 Q. And how did you resolve that lack of clarity
15 as to how dispersions evolved over time?

16 A. Well, we couldn't fully resolve it. All we
17 could do is take the invoice data to know which
18 dispersions had PFOA in them.

19 Q. What invoice data are you referring to?

20 A. The data that was summarized in the Barr
21 report.

22 Q. So you did not review the underlying invoice
23 data --

24 A. No.

25 Q. -- is that fair?

1 A. I didn't go back and look at all the --

2 Q. You relied on the Barr report for the invoice
3 data and Barr concluded that an estimate of PFOA content
4 in dispersions used in the coating process of 2,000
5 parts per million for high content PFOA dispersions was
6 reasonably applied to annual dispersions, right?

7 A. Right, but that was based on 2002
8 formulations and I'm not clear that those formulations
9 remain constant from '68 to 2002.

10 Q. Are you confident that they did change during
11 that period of time?

[REDACTED]

22 Q. So in your view this data was from 2002 and
23 you didn't utilize it because you didn't know if it was
24 representative going back in time; is that correct?

25 A. Right. Well, I mean, again, we started with

1 that because that gives us that 145 concentration and
2 then applied the decomposition -- the thermal
3 decomposition and the abater decomposition. That's what
4 gets us the 2,500 pounds per year emission but then we
5 also looked at the -- that 2001 spreadsheet which
6 strongly suggested that there was greater
7 concentration -- greater emissions and that's where we
8 were able to then get the higher, higher rates of the
9 7,000 and 10,000 depending on whether it was five days a
10 week or seven days a week.

11 Q. That's how you were able to get the higher
12 rates?

13 A. Right.

14 Q. Did you utilize the maximum concentrations
15 reflected on the MSDSes; is that correct?

16 A. Again, I never went back and did that
17 because I took the Barr as the -- as the basis and then
18 I took the 2001 Saint-Gobain-provided spreadsheet as the
19 other basis.

20 Q. And the 2001-provided Saint-Gobain
21 spreadsheet, do you have any understanding as to whether
22 that was intended to reflect actual APFO content?

23 A. I assumed it was because it was going as
24 a -- the part of the basis for their permit request to
25 New Hampshire, so I would have thought they would have

1 wanted to accurately reflect the potential emissions
2 that that plant would have after moving the processes
3 from Vermont to New Hampshire.

4 Q. That's what you I believe, right?

5 A. Yeah.

6 Q. Do you have any knowledge that that is
7 actually correct?

8 A. No direct knowledge.

9 Q. Did you review any deposition testimony that
10 bears on this subject?

11 A. There is one deposition with regard to the
12 addition of additional materials into the dispersant
13 when they were having issues with product quality.

14 Q. Did you review any deposition testimony of a
15 company representative of Saint-Gobain that discussed
16 the spreadsheets that were submitted to New Hampshire?

17 A. No.

18 Q. So you didn't consider that?

19 A. No.

20 Q. So you have no basis for rejecting whatever
21 that testimony was because you don't know what it is,
22 right?

23 A. Correct.

24 Q. Did you review any deposition testimony in
25 preparation or -- strike that.

1 Did you review any deposition testimony
2 before preparing either of your reports of Saint-Gobain?

3 A. Yeah, there's -- as I said, you'll find
4 there's two parts of -- Page was his name? That was
5 included in -- no, Peter Knapp, that was it, Peter
6 Knapp.

7 Q. Did you review any other deposition
8 testimony?

9 A. Just Gary's, just Gary Yoder's.

10 Q. That's your colleague?

11 A. Right.

12 Q. Your consultant at TRM?

13 A. Right, just that.

14 Q. Did you review any other deposition testimony
15 of any other Saint-Gobain or ChemFab employee?

16 A. No, just Mr. Knapp.

17 Q. Later on we'll get to some of your views on
18 what Saint-Gobain knew or should have known, right?

19 A. Mm-hmm.

20 Q. Don't you think if you're going to offer an
21 opinion on that subject, you would want to review the
22 testimony of people at the company and see what the
23 company knew or should have known?

24 A. I wasn't sure who was deposed or what they
25 would have said.

1 Q. Fair enough. Are we on the same page? You
2 would feel more comfortable, right, if you're going to
3 be testifying as to what a company knew or should have
4 known, you would want to see what the company actually
5 said?

6 MR. DAVIS: Objection to the question;
7 it's vague.

8 Q. Strike that. Let me ask it this way. Would
9 you want to know what the people at the company
10 testified to if you were going to offer an expert
11 opinion on what a company knew or should have known?
12 Would you have wanted to know that?

13 MR. DAVIS: Objection, speculation.

14 A. Yes, but I have a whole bunch of these
15 internal memos that clearly indicate that they were
16 aware of certain aspects of it that are then documented
17 in the Merits Report and that's why we have a big thick
18 book of --

19 MR. DAVIS: Is this a good time for a
20 break?

21 MR. FLEMING: Couple more follow-up
22 memos and time for a break.

23 BY MR. FLEMING:

24 Q. To make sure I have those right, you got
25 those internal memos. You don't know if somebody

1 testified about them at deposition, right?

2 A. No, I don't know.

3 Q. You don't know if they referred to other
4 memos in their deposition because you haven't reviewed
5 that deposition testimony?

6 A. That's correct.

7 Q. So you have --

8 MR. FLEMING: We can take a break.

9 Thank you.

10 THE VIDEOGRAPHER: The time is
11 approximately 1308. We are off the record.

12 (Whereupon, a luncheon recess was then
13 taken.)

14 THE VIDEOGRAPHER: We are on the record.
15 The time is approximately 1349. Please
16 continue.

17 BY MR. FLEMING:

18 Q. We're back on the record. Are you ready to
19 go, Dr. Hopke?

20 A. Yes.

21 Q. Did you have a good lunch?

22 A. Okay.

23 Q. So I have your Exhibit 11, which is the
24 binder that was provided to you by counsel of ChemFab
25 inspection reports that they compiled and it's got the

1 title 1999 -- I'm sorry 1992 to 2000 on it, okay?

2 A. Mm-hmm.

3 Q. I'll hand it over to you and we'll try to
4 work with it because we only have one copy of it, the
5 one you brought.

6 A. Yeah.

7 Q. Remember I was asking you before if you had
8 any data showing the temperature at which the catalytic
9 abaters were operating? Do you remember that?

10 A. Yes.

11 Q. Do you see on the second page there -- I
12 think -- strike that.

13 I think you previously testified that you
14 were relying on the fact that you saw some inspection
15 reports that said they weren't operating, correct?

16 A. That's correct.

17 Q. And you hadn't seen any data to show they
18 were operating or the temperature they were operating
19 at, right?

20 A. No, no, I saw that we had the operating
21 temperatures when they did the inspections. I said that
22 Saint-Gobain/ChemFab did not provide -- didn't seem to
23 have any records of the abater temperatures.

24 Q. And am I right that when you saw a couple of
25 instances of the abaters not operating for purposes of

1 your analyses, you assume they always weren't operating?

2 A. No, but we know then, at least some of the
3 time we know they weren't operating properly and even
4 more so at the times when there were the odor
5 complaints.

6 Q. How did you determine for what period of time
7 they were not operating, if you did?

8 A. There was no way to determine that.

9 Q. If you look at that exhibit on the second
10 page, doesn't it reflect that the abaters were operating
11 at a temperature of over 500 degrees?

12 A. Well, yeah, they're supposed to be operating
13 I think -- I don't remember now exactly what the
14 parameters were but it's very close to 600.

15 Q. Am I correct, Dr. Hopke, that according to
16 this inspection report, it was operating?

17 A. In that inspection report, yeah.

18 Q. If you go to a couple pages later, you see a
19 column that has temperatures reflecting that the abaters
20 were operating, right?

21 A. Yep.

22 Q. So you do have documents reflecting that the
23 abaters were operating at certain times there were
24 inspections, right?

25 A. Yes.

1 Q. And the temperatures at which they were
2 operating, right?

3 A. Yes, they're also noted that some of the
4 abaters were down.

5 Q. Okay. And you don't assume if some of the
6 abaters were down at a certain period of time, that
7 means all of them are down, right?

8 A. No.

9 Q. You don't assume that all of them are down
10 for a 30-year period, right?

11 A. Certainly not.

12 Q. Okay. As you sit here today, you don't have
13 any data showing you when the abaters were on and when
14 they weren't?

15 A. That's correct.

16 Q. So if we can now turn to your Class
17 Certification Expert Report, Dr. Hopke, at Table 1, I'd
18 like to ask you some questions about this spreadsheet.

19 A. Yes.

20 Q. And this is called Raw Materials Usage and
21 Air Data, North Bennington, Vermont, October 2001,
22 right?

23 A. That's correct.

24 Q. Did you prepare this Table 1?

25 A. No, we got it from -- got it from counsel

1 and it was one of the things we got from -- isn't this
2 the one we got from the Knapp deposition?

3 Q. You're asking your lawyer?

4 MR. DAVIS: I'm not answering but --

5 A. I think -- I'm not sure at the moment. I'd
6 have to go back and look to be sure.

7 Q. Who created this chart?

8 A. I'm not certain.

9 Q. Did you create the chart?

10 A. No.

11 Q. I'd like to mark the next exhibit.

12 (Hopke Exhibit 19, Table 6; Table 7
13 Actual Raw Material Use, Saint-Gobain,
14 Merrimack, NH and Bennington, VT, marked for
15 identification, this date.)

16 A. It came from Merrimack, okay.

17 MR. DAVIS: Don't conclude anything.

18 Q. You can conclude something if you believe
19 it's your opinion, Dr. Hopke; right?

20 MR. DAVIS: He was trying to compare the
21 table.

22 MR. FLEMING: But we shouldn't be
23 telling him what he can conclude or can't
24 conclude; right?

25 MR. DAVIS: Well, you put something in

1 front of him that said Merrimack,
2 New Hampshire, although if you look further
3 back it says Bennington, Vermont.

4 MR. FLEMING: Gary, would you agree with
5 me that you shouldn't be telling him what he
6 should conclude or should not conclude?

7 MR. DAVIS: Well, you didn't ask him any
8 questions.

9 MR. FLEMING: So regardless of whether I
10 ask a question, should you be telling him
11 what he should conclude and should not
12 conclude?

13 MR. DAVIS: I can tell him whatever I
14 feel like telling him in a deposition.

15 MR. FLEMING: Including what he should
16 conclude?

17 MR. DAVIS: That's correct.

18 MR. FLEMING: Where in the rules does it
19 let a lawyer tell his expert what he --

20 MR. DAVIS: Do we have to have this
21 colloquy now? You put a misleading document
22 in front of him.

23 MR. FLEMING: I haven't asked him a
24 question about it yet and you're telling him
25 you should not to conclude about it.

1 MR. DAVIS: I'm telling him to read it.

2 MR. FLEMING: We shouldn't tell a
3 witness what he should conclude or not
4 conclude. Let him make his own decision
5 about what he should conclude or not
6 conclude.

7 MR. DAVIS: If you want to put a
8 confusing document in front of him, I can
9 come back and ask later.

10 BY MR. FLEMING:

11 Q. Okay. Dr. Hopke --

12 A. Yes.

13 Q. -- I'd like to ask you some questions about
14 this document. It's got a number at the end that's
15 Bates number 05002177 on the very last page,
16 second-to-last page, table 8.

17 A. Yes.

18 Q. This is Exhibit 19. Are you aware that this
19 spreadsheet was produced by Saint-Gobain in this
20 litigation?

21 A. Yes.

22 Q. Do you agree that the data in your Table 1
23 copies verbatim the data in this exhibit as it appears
24 onto the Excel tab labeled Vermont?

25 A. Yes.

1 Q. So this --

2 MR. DAVIS: Starting on page 9? Is that
3 what you're asking.

4 A. Yeah, starting on page 9. That's correct.

5 Q. And both Exhibit 19 and your Table 1 lists
6 raw materials on the left-hand column, right?

7 A. That's correct.

8 Q. And for many of these raw materials, ammonium
9 perfluorooctanoate content is stated as a measure of
10 MSDS weight percentage, right?

11 A. That's correct.

12 Q. MSDS weight percentage means Material Safety
13 Data Sheet weight percentage, right?

14 A. That's correct.

15 Q. For each of the raw materials listed on the
16 right-hand column of either Exhibit 19 or your Table 1,
17 information regarding the weight percentage of APFO in
18 the material is provided?

19 A. That being?

20 Q. The information comes from Material Safety
21 Data Sheets, right?

22 A. That's correct.

23 Q. As stated on page T-1 of your Class
24 Certification Report?

25 A. Which page?

1 Q. Under table T-1, we're back to your Class
2 Certification Report.

3 A. Okay.

4 Q. For the raw material T30B, the MSDS percent
5 weight of APFO is listed as less than .5 percent. Do I
6 have that right?

7 A. T30B?

8 Q. Yes.

9 A. Yes.

10 Q. What is T30B?

11 A. Hum?

12 Q. What is T30B?

13 A. It's a surfactant mixture to -- it's one of
14 the surfactant mixtures used, is my understanding.

15 Q. How much T30B was used by ChemFab or
16 Saint-Gobain at its Water Street plant in a given year?

17 A. I don't know. I'd have to go back and look
18 that up.

19 Q. Do you have that data?

20 A. We have the invoices on what they bought.
21 We don't have the use data.

22 Q. Did you determine in your estimates how much
23 T30B was utilized in a given year and then multiply that
24 value by a figure less than .5 percent to calculate the
25 amount of APFO utilized?

1 A. No.

2 Q. What methodology did you utilize to calculate
3 emissions rates based on Material Safety Data Sheet
4 information?

5 A. From the Barr report which provided those
6 estimates.

7 Q. And where in the Barr report are you
8 referring?

9 A. It's Appendix A. Yeah, here we --
10 Table A-1.

11 Q. So you -- so can you explain that to me,
12 Dr. Hopke, where on that Table A-1 it lists the content
13 of the various surfactants or dispersions?

14 A. It doesn't. Barr, according to what they
15 say, used that information to derive the annual PFOA
16 emissions based on the annual dispersion usage and
17 making assumptions with regard to thermal degradation
18 and abater degradation.

19 Q. And on the annual dispersions usage column in
20 pounds, do you have any understanding as to the source
21 of that data?

22 A. Again, the description in the Barr report is
23 that they took the invoice data in order to be able to
24 aggregate that information.

25 Q. And what did they utilize to determine the

1 amount of APFO that might be in a dispersion?

2 A. Again, it would have been the MSDS sheets.

3 Q. You did the same thing?

4 A. No, I didn't repeat their calculation.

5 Q. Do you have -- so according to your testimony
6 Barr used the MSDSes to estimate APFO content; is that
7 right?

8 A. That's my understanding.

9 Q. And the MSDSes would list the APFO content
10 with a less than, right?

11 A. In some cases.

12 Q. In cases in which APFO content was listed
13 with a less than, what would the content of that
14 particular surfactant or dispersion be for AFO/APFO?

15 A. We don't know for certain but -- I'm not --
16 I don't remember -- they made assumptions based on the
17 2002 data that never -- I think they made the assumption
18 that it never exceeded, 2,000 but, you know, if it says
19 less than .05, then it could have been up to 5,000 and
20 that's why we thought that there was likely to be more
21 than estimated since they were taking the 2,000 and the
22 sheet says it could have gone up to 5,000.

23 Q. And, again, I think we discussed this
24 previously. Barr utilized operational data to come up
25 with the estimate of 2,000 parts per million, right?

1 That's what they said in their report?

2 A. My understanding is that they got that from
3 the 2002 MSDS which may have changed over time and --

4 Q. If you turn back to Exhibit 18, Dr. Hopke.

5 A. Dr. Barr?

6 Q. Yeah.

7 A. Okay.

8 Q. And don't they say that "based on operational
9 data at a similar facility in Merrimack, New Hampshire,
10 an estimate of PFOA content in the dispersions used in
11 the coating process of 2,000 parts per million for high
12 PFOA content dispersions was applied to annual
13 dispersions usage data and measured air emissions data
14 to estimate annual PFOA emissions"?

15 A. Yes.

16 Q. If I'm understanding you correctly, you also
17 though go on to provide a higher range that takes a
18 maximum concentration from the MSDSes for APFO; is that
19 correct?

20 A. That's correct.

21 Q. Can you cite to me any document that shows
22 that that maximum concentration on MSDSes, especially
23 those with a less than symbol, reflect the actual
24 concentration of APFO?

25 A. No.

1 Q. Do you have any information on whether or not
2 the raw material usage and air data that's set out at
3 your Table 1 for October 2001 is representative of the
4 prior 30 years of operations?

5 A. We don't know. I mean, we don't have data
6 that far back that lets us evaluate what changes --
7 whether there have been significant changes in the
8 formulation over time.

9 Q. And -- strike that.

10 MR. FLEMING: I'm going to mark another
11 exhibit.

12 (Hopke Exhibit 20, Bates number 13000019
13 with spreadsheet, marked for identification,
14 this date.)

15 Q. Dr. Hopke, I've handed you Exhibit 20 --

16 A. Yes.

17 Q. -- which was produced in native format under
18 the Bates number 13000019 as reflected by the cover
19 page, right?

20 A. Correct.

21 Q. If you would turn to the spreadsheet, do you
22 see that?

23 A. Yes.

24 Q. You don't cite to this spreadsheet in your
25 report, do you?

1 A. I'm not sure. It's certainly one we used
2 but whether we had it back in July, I'm not sure. I
3 don't think so. I think it's more recent than that.

4 Q. Okay. So this spreadsheet appears to
5 estimate APFO emissions rates, right, as a measure of
6 pounds per 24 hours for --

7 A. Pounds per hour.

8 Q. Pounds per -- does the 24 on the left there
9 suggest anything?

10 A. Oh, okay. Yeah, okay. That one is not one
11 I looked at before but the next sheet is the one where
12 it's pounds per hour. It looks like it's just
13 multiplied.

14 Q. Are there 31 different products or passes
15 that are included on this table?

16 A. It appears so. I have to count them up to
17 be certain.

18 MR. DAVIS: While he's doing that, I'm
19 going to object because there's been no
20 foundation for where this document came from
21 other than it was produced by Saint-Gobain.

22 Q. In your Declaration, which I had a copy of in
23 front of you, but I'd like to direct you to paragraph
24 10. Here it is, I've got it. I have the Declaration.
25 It's Exhibit 2.

1 A. Okay.

2 Q. And do you see at paragraph 10 there?

3 A. Yes.

4 Q. There's a discussion of an estimate by
5 Saint-Gobain and a spreadsheet?

6 A. Yes.

7 Q. Is this the spreadsheet that you're referring
8 to, this being Exhibit 20?

9 A. Yes.

10 Q. It is? Okay.

11 MR. DAVIS: Wait a minute.

12 A. I'm pretty sure it is. I'd have to go back
13 and compare my numbers with the numbers in my computer
14 with this but it certainly looks like it.

15 Q. Fair enough. You say --

16 MR. DAVIS: Did you know what Exhibit 20
17 was when you answered that question?

18 THE WITNESS: Yes, okay.

19 MR. DAVIS: I think you're confusing
20 him.

21 MR. FLEMING: You can't interrupt. The
22 confusion -- well, we'll move on. There's no
23 confusion.

24 BY MR. FLEMING:

25 Q. You say, Dr. Hopke, in your Declaration at

1 paragraph 10 that the spreadsheet, and you're pretty
2 sure it's Exhibit 20, was prepared for permitting of the
3 towers moved to Merrimack, New Hampshire plant in 2001;
4 correct?

5 A. That's my understanding.

6 Q. What's your basis for that assertion?

7 A. I'm not sure at this point. This is, you
8 know, sometime between the submission of the one report
9 and the Declaration so I think we -- as I recall.

10 Q. Do you know what, if any, assumptions went
11 into the preparation of this spreadsheet that is Exhibit
12 20?

13 A. No.

14 Q. How did you use this spreadsheet that is
15 Exhibit 20 to calculate emissions rates?

16 A. Okay. We summed them up and then multiplied
17 by 24 hours for the hourly rate, multiplied them by
18 either five days a week or seven days a week, not being
19 certain exactly what the operating schedule at the plant
20 was. Five days a week gives us the 7,000 pounds a year;
21 seven days a week gives us the 10,000 pounds per year
22 and it's in the pile of paper that's become -- has
23 become Exhibit 9.

24 Q. And did you attempt to determine whether the
25 plant was operating five days a week or seven days a

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

11 A. It would appear not.

12 Q. So your estimate based on running all of them
13 for 24 hours overestimates based on that, right?

14 A. Likely.

15 Q. If we could turn to the next exhibit,
16 Dr. Hopke, which I'm going to mark as number 20.

17 MR. DAVIS: 20 was the last one.

18 MR. FLEMING: I'm sorry, Exhibit 21.

19 Thank you for pointing that out.

20 (Hopke Exhibit 21, e-mail chain,
21 8/28/17, marked for identification, this
22 date.)

23 BY MR. FLEMING:

24 Q. Dr. Hopke, this is another e-mail chain and
25 it's dated August 28th, 2017, right?

1 A. Yes.

2 Q. And there's an initial e-mail from Cathy Dare
3 at the bottom of the second page?

4 A. Mm-hmm.

5 Q. And then there's an e-mail from you on the
6 first page, right?

7 A. Yes.

8 Q. So Miss Dare begins the chain by writing,
9 "Emily sent me a link to Matt's files to access the
10 historical records. Along with the historical
11 information was this table. I'm not sure it was
12 explicitly shared with us but it was downloaded with all
13 the other information as I was rushing to quickly wade
14 through all the various files. Gary said it was a
15 meaningful summary. I would propose we use this for
16 internal discussions only." Did I read that right?

17 A. Yes.

18 Q. The Emily mentioned is that Plaintiffs'
19 counsel, Emily Joselin?

20 A. Yes.

21 Q. Who is Gary?

22 A. This Gary.

23 Q. You're pointing to Mr. Davis?

24 A. Yes.

25 Q. Plaintiffs' counsel, correct?

1 A. Correct.

2 Q. Who is Matt?

3 A. Who is Matt? I think that's the guy at
4 Vermont DEC. I think one of the air modelers we talked
5 to at Vermont DEC but I'm not positive.

6 Q. Thank you, Dr. Hopke. On page 1 -- I'm
7 sorry, where are we? On page 1, on August 28th, you
8 wrote in an e-mail, "I'm not sure who Dr. Hassel is/was
9 and where that rate was found? Makes for an order of
10 magnitude different in the emissions." Did I read that
11 right?

12 A. That's correct.

13 Q. And then you list some data in a table,
14 right?

15 A. That's correct.

16 Q. You conclude by saying "so our 10, 1,000,
17 10,000 span the range although it looks like an upper
18 bound is more like 5,000," right?

19 A. Right.

20 Q. That's what you wrote on August 28th, 2017,
21 right?

22 A. Right. That's before I got the spreadsheet
23 data.

24 Q. Just a few days later on September 1st you
25 have an upper bound estimate of 10,000 pounds per year

1 PFOA emissions, right?

2 A. Right, because I think on that point we got
3 the spreadsheet.

4 Q. Is it your testimony that you got the
5 spreadsheet in between August 29th and September 2017?

6 A. I can't be sure. I mean, that -- it was the
7 spreadsheet that led us to the 10,000.

8 Q. So what I'm trying to get at is your opinion
9 and your basis as of August 28th, 2017 to believe that
10 the upper bound estimate in your view was more like
11 5,000.

12 A. Again, that was -- that was one of the
13 estimates. I mean, we've had -- you know, again there
14 have been several estimates as we learned more and try
15 to get more information that would provide us with more
16 reliable --

17 Q. Can you outline the methodology or provide me
18 with any documentation that would show why you chose not
19 to follow this 5,000 upper bound estimate you wrote
20 about on August 28, 2017?

21 A. I'm pretty sure that's because we got the
22 spreadsheet in there and that then suggested a more
23 definitive estimation of the emissions.

24 Q. And how was it that the spreadsheet -- what
25 methodology did you utilize to determine that the

1 spreadsheet was, quote, unquote, more definitive than
2 the data than you were saying -- let me finish if I
3 may -- upper bound of more like 5,000?

4 A. Because it had specific values for emission
5 rates for the various subprocesses and so we assumed
6 that since it was put together by Saint-Gobain, that
7 they would have a better estimate of their usage and
8 product formulations than we could guess -- we could
9 estimate from these documents.

10 Q. I'll mark the next exhibit, Dr. Hopke --
11 (Hopke Exhibit 22, spreadsheet of
12 historical information from Dare 8/28/17
13 e-mail, marked for identification, this
14 date.)

15 Q. -- which is Exhibit 22. And it's -- the
16 spreadsheet is the historical information that was
17 attached to that Cathy Dare e-mail of August 28, 2017.
18 Do you know who created the spreadsheet that's reflected
19 here?

20 MR. DAVIS: Which spreadsheet are you
21 talking about?

22 A. The one in Exhibit 22?

23 Q. Why don't we start with any of them. Do you
24 know who prepared any of the spreadsheets or tables
25 reflected in this document?

1 A. My understanding was that these were Vermont
2 DEC values, at least that's what I remember at this
3 point.

4 Q. Did you rely on any of the information
5 contained in this spreadsheet, Dr. Hopke?

6 A. Did I rely on it? No.

7 Q. Why not?

8 A. Because I was trying to make my own
9 independent estimates based on what other information we
10 could gather so that, you know, we would have something
11 that would be not necessarily dependent on Vermont DEC.

12 Q. Did you rely --

13 A. Not that we didn't believe them but when
14 we're looking -- it's always good to have multiple pairs
15 of eyes looking at a problem to try and make sure that
16 we've seen all of the possibilities.

17 Q. Did you rely on any data provided by the
18 Vermont DEC?

19 A. Not that I'm aware of. We certainly
20 compared our results to theirs. We looked at their --
21 you know, their estimate was something like 1,300 pounds
22 per year and, you know, that was, you know, part of the
23 reason for looking at the 1,000 pound per year.

24 Q. As you sit here today, you don't think you
25 relied on any data from the Vermont DEC; fair?

1 A. Fair.

2 Q. And the reason you didn't rely on any data
3 from the Vermont DEC is that according to your
4 testimony, you wanted to develop your data
5 independently; is that correct?

6 A. That's correct.

7 Q. If you turn to the third page of Exhibit 22,
8 do you see the table there with the various towers?

9 A. Yes.

10 Q. And do you see where it says below the table,
11 "my calculations based on D. Hassel's information yield
12 emission rates that are 10 times less"?

13 A. Yes.

14 Q. Did you consider that comment at all in
15 forming your opinions here today?

16 A. No. Again, I never really understood who
17 Mr. Hassel was and what they were -- where in fact that
18 was coming from.

19 Q. Did you ever call up Vermont DEC and ask
20 about that?

21 A. We had a couple of conversations with their
22 air modeling people but they were embroiled in their own
23 discussions with you, with Saint-Gobain, and didn't want
24 to put a lot of time into our process and so we were
25 discouraged from talking extensively with them.

1 Q. So let me see if I could just -- if I get it
2 clear. Did you ask Vermont about this comment about the
3 calculations by D. Hassel's information yielded emission
4 rates that are 10 times less? Did you ask them about
5 it?

6 A. No.

7 Q. Did anyone at Vermont DEC discourage and said
8 don't ask about it?

9 A. Not directly, no.

10 Q. Did anyone indirectly tell you not to ask
11 about the view that the emissions rates were 10 times
12 less than the calculations listed here?

13 A. Not specifically, no. There was a more
14 general, please don't bother us.

15 Q. Did that prevent you from or did -- you did
16 wind up talking to Vermont DEC?

17 A. Yeah, we had a couple of one-hour phone
18 calls but it was more discussing the parameters of the
19 dispersion modeling and less on the emissions. I mean,
20 they basically also said that, you know, estimating the
21 emissions was a very difficult task.

22 Q. Did you find that to be the case as well?

23 A. Yeah, because there's no measurement data.

24 Q. We can go back to your Class Certification
25 Report, Dr. Hopke, so that's Exhibit 1, right?

1 A. Mm-hmm.

2 Q. If you turn to page 4. Are you with me on
3 page 4?

4 A. Yes.

5 Q. You beat me to it, thank you. If you look at
6 the last sentence again above section 3.5, you say that
7 a unit emissions approach -- strike that.

8 "A unit emission rate approach was used as
9 model input for this report with runs displayed for
10 emissions for 100 pounds per year, 1,000 pounds per year
11 and 10,000 pounds per year," right?

12 A. Mm-hmm.

13 Q. Then you go on to say, "these ranges,
14 including the 10,000 pounds per year upper bound, are
15 reasonable given the data we have."

16 A. Yes.

17 Q. Is the 100 pound estimate reasonable in your
18 view?

19 A. I think it's an underestimation.

20 Q. Is it a reasonable -- when you say "these
21 ranges, including the 10,000 pounds per year upper
22 bound, are reasonable," are you changing your opinion
23 about that as you sit here today or no?

24 A. It's possible. Whether it is probable is
25 another question.

1 Q. So let me see if I can break it down. I'm
2 really just asking you if your opinion has changed based
3 on what you wrote in your report there?

4 A. Yeah, I should have been clearer; that that
5 was a lower bound to try and make sure that we could
6 reproduce -- largely reproduce the Barr approach which
7 was 145 pounds a year.

8 Q. So let's just see if we can get it clearly
9 and then we'll see if we're on the same page. In your
10 report you wrote that the ranges, right, 100 pounds,
11 1,000 pounds per year and the 10,000 pounds per year,
12 right, that those ranges were reasonable, right?

13 A. Yep.

14 Q. 100 pounds, is that a reasonable lower range
15 of your estimate or no?

16 A. No, I don't think so.

17 Q. So you no longer believe that 100 pounds is
18 reasonable given the data?

19 A. Right.

20 Q. How about 1,000 pounds, do you believe that
21 1,000 pounds, as you sit here today, is reasonable given
22 the data?

23 A. As a lower bound, yeah.

24 Q. Do you believe it's reasonable?

25 A. Yeah.

1 Q. 10,000 pounds, do you believe that is
2 reasonable as you sit here today?

3 A. Again, it's possible but it's probably
4 overestimated given the fact that they weren't running
5 the 31 lines that we were summing.

6 Q. If we wanted to, you know, try to verify or
7 test the methodology that you used to change your view
8 that 100 pounds per year was reasonable as of
9 September 1st, 2017 to today, how would we go about
10 doing that, to test how you utilized the methodology and
11 follow it?

12 A. Well, again, reviewing the material,
13 particularly reviewing the spreadsheet which at that
14 time I didn't understand represented independent process
15 lines that might not all be running simultaneously and
16 so therefore -- but, you know, we then, you know, took
17 the Barr data and, you know, compensated for the
18 decomposition that we don't think took place. That gets
19 us to an estimate of 2,441 pounds a year. If there is
20 some decomposition, then it could be down to 1,000.
21 That's what the Vermont people estimated, 13 something,
22 1341, something in that ballpark.

23 Again, lines are not running all the time,
24 formulations change, so could it be as low as 1,000?
25 Yes. Do I think it's more likely in the somewhat higher

1 range, yes. Do I think it's probably up to the 10,000?
2 It's possible but now it seems that's less likely.

3 Q. Again, how about 100 pounds per year, when
4 you said it was reasonable on September 1st, 2017?
5 Could you quantify the, you know, percentage
6 possibilities? Did you calculate at all as to whether
7 100 pounds was more likely as of September 1st, 2017 to
8 estimate actual emissions as compared to 10,000? How --
9 did you quantify it in any way?

10 A. No. I mean, again, that was down near the
11 Barr estimate and so, you know, I was really talking
12 about being reasonable for us to model these three
13 different levels to try and get at, you know, looking at
14 the distributions, making sure, for example, that we
15 didn't have substantial discrepancies in the spatial
16 deposition of our AERMOD modeling from the Vermont
17 modeling, from the Barr AERMOD modeling and making sure
18 that the general -- there was general agreement there,
19 and then the question is how does it scale as you
20 increase the emissions.

21 Q. When -- on September 1st, 2017 you identified
22 100 pounds as reasonable. Did you have that Barr data
23 that you just mentioned?

24 A. Yeah.

25 Q. You had it at that time, right? What, if

1 any, data did you gather after you submitted your Class
2 Certification Expert Report on September 1st, 2017 that
3 caused you to change your view about that 100 pounds?

4 A. Again, reviewing that spreadsheet.

5 Q. Which spreadsheet Dr. Hopke?

6 A. The spreadsheet in Exhibit 20? Yeah, 20.

7 Q. You had that at the time of this report?

8 A. I think so.

9 Q. I asked you at the outset if you wanted to
10 make any corrections to your Class Certification Report
11 and you read one that listed 4 instead of 5. You didn't
12 identify this 100 pound?

13 A. No, I missed that.

14 Q. If we want to identify any data that you
15 relied on after you submitted this expert report culling
16 100 pound estimate to be reasonable, that changed your
17 view; you've identified the spreadsheet that you already
18 had, right; you identified the Barr data you already
19 had, right? Is there anything else?

20 A. No, it's just a matter of reviewing it and
21 having, again, more time -- I mean, we had very little
22 time to look at that spreadsheet so I didn't really get
23 into that in detail.

24 Q. But you had enough time to submit a report
25 and sign it to provide an expert opinion in this case,

1 right, September 1st, 2017?

2 A. Right but that came somewhere very close to
3 the deadline so, again, it's a question of as you have a
4 chance to review material and look at it over time.

5 Q. When did you first realize after you
6 submitted the September 1st, 2017 expert report that
7 your comment, 100 pound estimate was reasonable, was
8 wrong? Was it when I first asked you today?

9 A. Yeah. Again, I didn't pay attention to the
10 specific wording in this report. I mean, we obviously
11 made a modification when we got to the Declaration from
12 October.

13 Q. Nothing in your Declaration said that you
14 were disavowing that 100 pound estimate that you called
15 reasonable, right?

16 A. No.

17 Q. Correct?

18 A. Correct.

19 Q. If we could turn to another exhibit.

20 A. Glad I don't have to cart all this
21 afterwards.

22 (Hopke Exhibit 23, April 1992 Alliance
23 ChemFab Corporation Diagnostic Test Program
24 Results, marked for identification, this
25 date.)

1 Q. So I've handed you Exhibit 23 which is a
2 ChemFab Corporation Diagnostic Test Program Results by
3 Alliance Technologies Corporation dated April 1992,
4 right?

5 A. Yes.

6 Q. Have you seen this document before,
7 Dr. Hopke?

8 A. Yes.

9 Q. Are you aware that Mr. Yoder relied upon the
10 Table 10 that appears at page 12 in his expert report?

11 A. Yes.

12 Q. Can you take a look at Table 10 on page 12?

13 A. I'm trying not to get them out of order.
14 There we go. Okay.

15 Q. Thank you. Do you see where it says
16 "tentatively identified compounds"?

17 A. Yeah.

18 Q. You see where it says "fluorinated
19 hydrocarbon"?

20 A. Yes.

21 Q. Is it fair to say the fluorinated hydrocarbon
22 was tentatively identified in this particular one
23 coating tower, Tower E?

24 A. That's how it's reported.

25 Q. Do you know how many other towers were

1 operational in North Bennington in 1992?

2 A. I don't remember right off. There were
3 multiple ones.

4 Q. Is there any indication that Alliance
5 detected fluorinated hydrocarbons in any other coating
6 towers in 1992 in connection with this report?

7 A. I don't think so but I'm not sure that
8 everything was in fact measured because most of what
9 they reported was Tower E, if I remember correctly.
10 There is a Tower P, and I'm not sure what else was
11 measured. It was not clear to me one way or the other
12 whether everything was or was not stack tested.

13 Q. Okay. Let me see if I can rephrase the
14 question and ask it a little more precisely. Is there
15 anything in the Alliance report from 1992 that
16 identified fluorinated hydrocarbons aside from this
17 Table 10 at Tower E?

18 A. Not that I remember.

19 Q. Do you know what operation was being
20 performed in Tower E when the tentative detection of
21 fluorinated hydrocarbons was made?

22 A. No.

23 Q. Do you know what product was being made at
24 the time?

25 A. No, I don't and I'd have to go back and read

1 the report.

2 Q. Did you try to determine that one way or the
3 other?

4 A. No, because it wasn't clear -- again, it
5 seemed like such partial data that it really wasn't
6 going to give us a comprehensive view of what the
7 emissions were from this plant.

8 Q. You did not try to determine one way or the
9 other; correct?

10 A. Right.

11 Q. Was the product representative of other
12 products made in North Bennington, Vermont, or
13 Bennington, Vermont?

14 A. I assume so but I don't know for sure.

15 Q. What is the basis for your assumption?

16 A. Because I -- you know, they would be running
17 multiple products. Whether they would be picking a
18 particular one because they thought it was going to have
19 higher or lower emissions, it's not clear. So, you
20 know, I assume they picked a representative tower.

21 Q. I don't mean this in a pejorative way but
22 that's a guess, right?

23 A. It's an assumption.

24 Q. Do you have any factual data to support that
25 assumption?

1 A. No.

2 Q. Again, we're talking about a product that you
3 don't know, right? You don't know what product is
4 being --

5 A. That's correct.

6 MR. DAVIS: He might know if he reads
7 the report but I don't think you want him to
8 do that right now.

9 Q. Absolutely. If you want to read the report
10 to answer any document -- to answer any questions --

11 A. Is it in there?

12 Q. I don't know, Dr. Hopke. You're the man
13 testifying today?

14 A. If I can't remember, you can't remember,
15 then it's hard to blame me for not remembering either.

16 Q. Don't misunderstand my question. I'm not
17 blaming you for anything. I'm just trying to find out
18 your opinions and if you feel that the document would
19 assist you in answering my questions, yes, you should of
20 course feel free to read it.

21 A. Okay. All right. Give me a minute here.

22 Q. Sure.

23 A. The process description is extremely vague.
24 It's not saying what they were making. It's not saying
25 why they chose Towers E and P. They're only giving a

1 general description of the glass fabric coating typical
2 for structural products so there's no detail.

3 Q. Fair enough.

4 A. So as far as I can see in a quick review,
5 that information is unavailable.

6 Q. So -- in that document?

7 A. In that document.

8 Q. Dr. Hopke, the term fluorinated hydrocarbon
9 refers to a broad class of molecules or substances,
10 right?

11 A. That's correct.

12 Q. How many different substances could be
13 classified as a fluorinated hydrocarbon?

14 A. I don't know specifically but many.

15 Q. Would you agree with me that the 1992 report
16 does not state what fluorinated hydrocarbon was
17 tentatively identified from Tower E?

18 A. That's correct. They did not do a detailed
19 mass spectrum analysis that would enable them to
20 determine the specific compound.

21 Q. To try to get more information on what this
22 fluorinated hydrocarbon might have been, do you recall
23 that you and Mr. Yoder called the Vermont DEC in May
24 2017 to discuss it?

25 A. Yeah, the key was whether they could --

1 whether that was a definitive measure of the PFOA or
2 not. Oh, I mixed things up here. I screwed it up for
3 you.

4 Q. I'll mark the next exhibit, Dr. Hopke.

5 (Hopke Exhibit 24, Expert Report of
6 Gary T. Yoder, 9/1/17, marked for
7 identification, this date.)

8 Q. At the bottom of page 4, at paragraph 2, do
9 you see there's a reference to a May 2nd, 2017
10 teleconference?

11 A. Yes.

12 Q. Were you a part of that telephone call?

13 A. No, Gary called. I'm pretty sure Gary
14 called.

15 Q. To the best of your memory you were not part
16 of that phone call as you sit here today?

17 A. I don't think so.

18 Q. I think we spoke over each other, which
19 neither of us is intending, but to the best of your
20 memory, as you sit here today, you don't believe you
21 were part of that phone call?

22 A. I don't believe so.

23 Q. Mr. Yoder writes, "per May 2nd, 2017
24 teleconference with Mr. Philip Cannata of the VDEC, the
25 VDEC did not believe all of the fluorinated hydrocarbons

1 measured by Alliance Technologies was PFOA, possibly an
2 order of magnitude less." Did I read that correctly?

3 A. Yes.

4 Q. "This assumption would equate to 0.015 pounds
5 per hour or 1,445 pounds per year." Did I read that
6 right?

7 A. Right.

8 Q. "Mr. Cannata also indicated that during a
9 VDEC discussion with the ChemFab engineer, the engineer
10 roughly estimated 100 pounds of PFOA emitted from each
11 of the 11 stacks per year for 1,100 pounds per year."
12 Did I read that right?

13 A. Yes.

14 Q. "Based on this communication with VDEC, this
15 analysis included a mid-range PFOA emission rate value
16 of 1,000 pounds per year," right?

17 A. That's correct.

18 Q. Who is Philip Cannata?

19 A. One of the Vermont DEC staff who, if I
20 remember right, he was the AERMOD modeler, not the
21 CALPUFF modeler.

22 Q. Of all the people who worked for the Vermont
23 DEC, do you have any understanding of why it was decided
24 to speak with Mr. Cannata about the subject?

25 A. Because he was the AERMOD modeler.

1 Q. And according to Mr. Yoder's report,
2 Mr. Cannata was of the view that he didn't believe that
3 all of the fluorinated hydrocarbons measured by Alliance
4 was PFOA, possibly an order of magnitude less, right?

5 A. That's correct.

6 Q. Do you agree with Mr. Cannata or disagree or
7 do you have a view?

8 A. Again, this is only the measure of one
9 tower, so it certainly could be less but I don't think
10 we can say one way or the other definitively without
11 more compositional data.

12 Q. Aside from definitively, could you say one
13 way or the other with any reasonable degree of
14 possibility?

15 A. I don't think so because, again, we don't
16 know exactly what was going on.

17 Q. Maybe we can turn back to your Merits Report,
18 Dr. Hopke.

19 A. Okay. Merits Report or the Certification?

20 Q. Merits Report on Exhibit 2.

21 MR. DAVIS: 4.

22 MR. FLEMING: I keep doing that, 4.

23 A. 5 actually. This is 4.

24 Q. You can use your duplicate copy of Exhibit 5.

25 A. Then I don't mess it up.

1 Q. Dr. Hopke, at pages 1 to 2, you write that
2 "ChemFab failed to comply with the permit requirement
3 for more than 10 years, from November 1979 to June
4 1990," correct?

5 A. That's correct.

6 Q. What methodology did you apply to assert that
7 ChemGuard (sic) failed to comply with Vermont permitting
8 requirements?

9 A. Particularly I looked at, again, documents
10 and we have the -- you know, again in here we have the
11 Vermont regulations which would have called for them to
12 have permits, and we have the memorandum at one point
13 that says that they never -- you know, that in 1990 we
14 should get permits and cover everything because at this
15 point nothing's covered. So that was an internal memo
16 and, again, it's referenced here. I'd have to go back
17 and find it specifically.

18 Q. So Dr. Hopke, you reviewed a memo that led
19 you to believe that, from 1990 that ChemFab didn't have
20 a permit, right?

21 A. Right. If we look at the bottom of page 1,
22 1, 2, 3, 4, 5, 6 lines from the bottom, "in November '89
23 ChemFab executives recognized that ' we have neglected
24 the permitting of the other towers installed at the
25 plant and it would be a good opportunity to bring the

1 whole facility into compliance with the permit
2 requirements'" and that was because they were trying to
3 put in a new tower at that time and recognized that none
4 of the towers had been properly permitted.

5 Q. And again, the basis for your opinion about
6 that is reading that document, right?

7 A. Yes.

8 Q. Did you apply any principle of chemistry to
9 reach that conclusion about that document?

10 A. No.

11 Q. Did you ask for any other documents produced
12 by Saint-Gobain to learn more about the context or any
13 other facts that might have pertained?

14 A. No.

15 Q. Again, you're not a lawyer, right?

16 A. No.

17 Q. Do you hold yourself out as an expert in
18 Vermont law?

19 A. No.

20 Q. Or Vermont regulations?

21 A. No. But I have considerable experience in
22 air quality management. I was the Chair of the Clean
23 Air Scientific Advisory Committee. I've served on
24 multiple EPA panels. I've served on a number of NRC
25 committees involved in air pollution and risk and

1 aspects of that. I've been consulting on these issues
2 since 1981 so --

3 Q. And consulting on those issues but not
4 compliance with Vermont permit, right?

5 A. Not compliance, not specifically.

6 Q. With those credentials when you reviewed that
7 document, you didn't have to apply any of that expertise
8 to form a judgment to find out whether a permit was
9 granted or not, did you?

10 A. No, again, the statute states in clear
11 language that a permit is needed. They're stating in
12 clear language that they didn't get a permit. It seems
13 like that's a problem.

14 Q. That's your view upon reading those factual
15 documents and you applying what you understand the law
16 to be, right?

17 A. Absolutely.

18 Q. You say in your report "that the section
19 5-501 of the Vermont Air Pollution Control Act required
20 notification of and permission by the Vermont DEC for
21 construction of new air containment sources," right?

22 A. Yes.

23 Q. What kind of notification was required? What
24 form did it need to take?

25 A. I assume some sort of written form but I

1 don't know for certain.

2 Q. What form of permission, if any, would be
3 required?

4 A. Again, I would assume that the Vermont DEC
5 would have issued some sort of written document that
6 stated they had permission to move ahead with
7 construction.

8 Q. And that's an assumption, right?

9 A. That's an assumption.

10 Q. Not based on factual information? It's not
11 based on legal background, right?

12 A. Well, normally you have to apply for a
13 permit and permits are required. You know, again,
14 that's sort of a standard approach to permitting new
15 pollution sources or potential pollution sources.

16 Q. Was -- do you have any information as to
17 whether or not that permission had to be in writing back
18 in 1979 in Vermont?

19 A. I don't know for certain.

20 Q. That didn't come up in your conversations
21 with Vermont at all, right?

22 A. No.

23 Q. When it says "construction of new air
24 containment sources required notification of and
25 permission by the Vermont DEC," what's "construction"

1 mean within the definition of this statute?

2 A. Again, not being a lawyer, I don't know for
3 certain. I would take it as plain language that if
4 you're building something, you're going to have to
5 get -- at least notify the State and get their
6 agreement.

7 Q. Do you have any understanding as to what a
8 new air containment source within the meaning of the
9 statute meant?

10 MR. DAVIS: You mean contaminant?

11 Q. I'm sorry, you're absolutely right.
12 Contaminant source, thank you for the correction.

13 A. Right, and that's something that's putting
14 an air pollutant in the air.

15 Q. Did you review any sort of history or
16 regulations to determine what a new air contaminant
17 source was in forming your --

18 A. Not in the State of Vermont.

19 Q. To form your opinions in this case did you do
20 any research on what new contaminant sources were under
21 any legislative scheme for forming your opinions in this
22 case?

23 A. Well, I'm relatively familiar with the
24 section 5.09 of the Clean Air Act and the regulations
25 with regard to hazardous air pollutants.

1 Q. You're opining on the Vermont Air Control Act
2 in this case, right?

3 A. Right, where I assume some degree of
4 parallelism.

5 Q. You made that assumption, right?

6 A. Yeah, and again --

7 MR. FLEMING: I'm sorry, you're
8 motioning. Someone is motioning at you. I'd
9 appreciate that that not occur.

10 Q. So your lawyer just pointed to something in
11 your binder that you're now turning to, right?

12 A. Right.

13 Q. Can you explain that to me?

14 A. The section 5.01 here in terms of review,
15 construction, or modification of new air contaminant
16 sources. So, you know, and so it's -- you know, it's --
17 the point is that this is a source which when it was at
18 its original site was already cited for -- and entered
19 into a consent decree to put in pollution controls, so
20 that, you know, that then subsequently when they moved
21 and didn't -- you know, they knew they were emitting
22 contaminants because they'd already had the odor
23 complaints and consent decree with the State of Vermont.
24 So, therefore, they should have known that, you know,
25 permitting was going to be essential and then, you know,

1 in here there are definitions. Air contaminant means
2 dust, fumes, mist, other particulate matter, vapor,
3 gases, odorous substances or any combination thereof.
4 So, you know --

5 Q. So you read that and formed your opinion?

6 A. Yes.

7 Q. Okay. That is -- you're reading from a
8 statute, right?

9 A. Right, this is section 5-501 of the -- of
10 the Vermont?

11 Q. If we turn to the next exhibit.

12 (Hopke Exhibit 25, Statutes and
13 Regulations Concerning Air Pollution Control,
14 State of Vermont, 11/4/79, marked for
15 identification, this date.)

16 Q. So I've handed you a statute I think you were
17 referring to. 5-501?

18 A. Yeah.

19 Q. I was going to ask you a question as to
20 whether you read page 53 at subprovision 3. It's the
21 Bates number ending in 863.

22 A. 863, okay. Yes. That's what I was just
23 quoting from.

24 Q. Ah, okay, so subprovision 3.

25 A. Yeah.

1 Q. Do you see the last sentence there that says,
2 "failure of the Secretary to issue an order within the
3 time prescribed herein shall be deemed a determination
4 that the construction, installation, or modification of
5 the source may proceed provided that it is in accordance
6 with the plans, specifications or other information, if
7 any, required to be submitted." Do you see that?

8 A. Yes.

9 Q. So does that communicate to you whether or
10 not a written permit was required to be provided by the
11 State under the statute?

12 A. Not if they had communicated with the State
13 that they were going to in fact create this contaminant
14 source but the indication from the quote and the lack of
15 state documentation would suggest that no such
16 communication ever took place.

17 Q. So, again, just to make sure I've got the
18 answer to the particular question I was asking, do you
19 agree that written notification of a permit by the state
20 was not required under the statute; is that correct?

21 A. Not if the state chose not to.

22 Q. Or failed to do so?

23 A. Or failed to do so in a timely manner.

24 Q. And you formed that opinion just by reading
25 the words of the statute right now, right?

1 A. Yeah. I mean, I had read this before.

2 Q. Whenever you read it, you formed that view?

3 You didn't look at anything else to form that?

4 A. No.

5 Q. You read the statute?

6 A. Right.

7 Q. Turn to the next document. Next exhibit I
8 should say which is Exhibit 26.

9 (Exhibit 26, 11/27/89 telephone
10 memorandum, Skip Crego to Chris Jones, Bates
11 13002573, marked for identification, this
12 date.)

13 Q. So Dr. Hopke, this is a memo dated
14 October 27, 1989 with a Bates number 13002573, right?

15 A. That's correct.

16 Q. And this is the -- strike that. This is the
17 memo that you cite in your Merits Expert Report on
18 page 1, four lines up from the bottom, right?

19 A. That's correct. Let's see. Oh, yeah, in
20 the first paragraph, right.

21 Q. Four lines up from the bottom of page 1,
22 right, telephone memorandum of the Merits Report?

23 A. No, it's in the first paragraph; that this
24 would be a good opportunity to permit all the towers at
25 the site.

1 Q. Are we on your Merits Expert Report?

2 A. No, I was looking at the --

3 Q. We had a little disconnect there.

4 A. I'm sorry.

5 Q. That's okay. The memorandum you were just
6 looking at is cited in your expert report, right?

7 A. Yes.

8 Q. And that's four lines up from the bottom of
9 page 1 of your Merits Expert Report, right?

10 A. That's correct.

11 Q. And you wrote in your Merits Expert Report
12 that "in November 1989 ChemFab executives recognized
13 that 'we have neglected the permitting of the other
14 towers installed at the plant and this would be a good
15 opportunity to bring the whole facility into compliance
16 with the permit requirements.'" Right?

17 A. That's correct.

18 Q. And the basis for your opinion about that is
19 this memo that you have in your hand as Exhibit 26?

20 A. Yes.

21 Q. Now, you described this as a telephone
22 memorandum from Skip Crego, right?

23 A. Yes.

24 Q. And Skip Crego is identified as a plant
25 engineer at ChemFab, right?

1 A. That's correct.

2 Q. And in the "to" line, the telephone
3 memorandum states it's to Chris Jones, right?

4 A. That's correct.

5 Q. And he was employed by the Vermont DEC,
6 right, in November of 1989?

7 A. That's my understanding.

8 Q. And next to Chris Jones' name in the "to"
9 line it appears someone had initialed CBJ, right?

10 A. Mm-hmm.

11 Q. Right next to his name?

12 A. Yes.

13 Q. Do you agree that the telephone call
14 summarized in this memorandum was from Skip Crego to
15 Chris Jones?

16 A. That's my understanding.

17 Q. Do you also agree that Chris Jones actually
18 wrote and then initialed this memorandum following the
19 call?

20 A. That's correct, and that's why he sent the
21 copies to the administration in Vermont DEC.

22 Q. So you state that this memo signifies that
23 ChemFab executives recognized that we have neglected the
24 permitting of the other towers installed in the plant
25 but this is Chris Jones writing this memo, right?

1 A. Right, but Skip agreed and he said he would
2 like to bring the whole facility into compliance.

3 Q. Do you see where in the third sentence it
4 says, "I discussed with Skip," right?

5 A. Yep.

6 Q. And "I" is Chris Jones, right?

7 A. Mm-hmm.

8 Q. "The fact that we," right?

9 A. Mm-hmm.

10 Q. Chris Jones is with Vermont, right? "We" is
11 referring to Vermont, right?

12 A. Yeah.

13 Q. "Have neglected the permitting of the other
14 towers installed at the plant and that this would be a
15 good opportunity to permit all the towers at the site."
16 Did I read that right?

17 A. Yes.

18 Q. And do you have any basis to opine on what
19 this memo means, who wrote it, who the "we" is
20 referencing, other than just reading it as we sit here
21 and as you read it before?

22 A. No. I mean, again, it appears that they're
23 both agreeing that there was negligence to get the
24 permits in place but now would be a great time to bring
25 everything into compliance.

1 Q. Do you have any information or view on
2 whether this suggests that Vermont did not respond to
3 plans that were submitted -- did not respond to plans
4 that were submitted and that Vermont had neglected the
5 permitting of the other towers?

6 A. I don't know. It's not clear.

7 Q. And that's not something that you called up
8 Vermont to ask, right?

9 A. No.

10 Q. So if we could turn to your Merits Report at
11 section 2.7.

12 A. Okay.

13 Q. On page 3 at the first sentence, it says --
14 are you with me?

15 A. Yeah.

16 Q. Great. "Beginning in 1984, Vermont DEC
17 required ChemFab to identify and control hazardous air
18 contaminants from the Water Street plant." Do you see
19 that?

20 A. Yes.

21 Q. And then at the third line there, again, at
22 section 2.7, you state that ChemFab was required to
23 attempt to obtain data on the chemical characteristics
24 of the inlet and exhaust streams to and from the abaters
25 in terms of chemical compound, flow rates, and parts per

1 million using gas chromatography and mass spectrometry.

2 Did you I read that right?

3 A. That's correct.

4 Q. And then on page 4 of your Merits Report, the
5 last sentence above number 3, you write that "had
6 ChemFab/Saint-Gobain complied with Vermont DEC
7 requirements, they should have tested for PFOA and other
8 perfluorinated compounds." Did I read that right?

9 A. Right.

10 Q. In your work on this case did you see any
11 Vermont law or regulation existing between 1968 and 2002
12 that identified APFO or PFOA emissions in any way?

13 A. No.

14 Q. During its years of operation, ChemFab would
15 have been regulated by air pollution regulations, right?

16 A. Yes.

17 Q. In Vermont, right? What agencies promulgated
18 those regulations?

19 A. Vermont DEC.

20 Q. Who enforced them?

21 A. Vermont DEC.

22 Q. Have you ever heard of the Vermont Agency of
23 Natural Resources?

24 A. That's the parent organization of Vermont
25 DEC.

1 Q. Who would have enforced the regulations
2 between the two?

3 A. I -- my understanding was Vermont DEC but
4 I'm not certain.

5 Q. And have you ever served any enforcement role
6 for Vermont with regard to its air pollution
7 regulations?

8 A. No.

9 Q. PFOA or APFO were not regulated compounds in
10 Vermont during any year in which ChemFab or Saint-Gobain
11 operated in Vermont, correct?

12 MR. DAVIS: Objection to the question as
13 being vague.

14 A. Not that I know of.

15 Q. Did you identify any information in your work
16 on this case suggesting to you that the State of Vermont
17 ever identified PFOA or APFO to Saint-Gobain or ChemFab
18 to test?

19 A. I am unaware of any such request.

20 Q. Go to the next exhibit. It's Exhibit 27.

21 (Hopke Exhibit 27, Memo from Bill Bress
22 to Harold Garabedian SGPPLVT13000321, marked
23 for identification, this date.)

24 Q. That I've handed, Dr. Hopke?

25 A. Hmm, mm.

1 Q. This is a document with a Bates number
2 13000321, right?

3 A. That's what it says.

4 Q. And it's a memorandum from a Bill Bress,
5 right?

6 A. Mm-hmm.

7 Q. To Harold Garabedian, right?

8 A. Yes.

9 Q. And it identifies Harold Garabedian as the
10 Acting Director, Air Pollution Control Division for the
11 Agency of Natural Resources in Waterbury, Vermont?

12 A. That's correct.

13 Q. Did you review this document when preparing
14 your opinions in this case?

15 A. I almost certainly looked at it but I don't
16 remember particularly. It would have been one of many
17 documents.

18 Q. And does Dr. Bress inform Mr. Garabedian that
19 he had reviewed the report on air quality impacts of the
20 Chemical Fabrics Corporation in North Bennington,
21 Vermont?

22 A. Yes.

23 Q. And does he say that "it would appear that
24 all the chemical toxic emissions we were most concerned
25 about are below the Hazard Limiting Values"?

1 A. Yes.

2 Q. Does he add that "since the compounds are not
3 present in hazardous levels in the ambient air, major
4 attention should now be aimed at reducing offensive
5 odors at the site." Do you see that?

6 A. Yes.

7 Q. So ChemFab did perform testing and
8 coordinated that testing with Vermont which evaluated
9 the testing, is that fair?

10 A. Yes.

11 MR. DAVIS: Let me interpose an
12 objection. This document is not dated.

13 Q. Okay. If we could turn to the next exhibit.
14 Exhibit 28.

15 (Hopke Exhibit 28, 1/20/88 Chemical
16 Fabrics Corporation, North Bennington,
17 Vermont, Toxic Air Contaminant Impact Study,
18 marked for identification, this date.)

19 Q. Exhibit 28 is a document dated January 20th,
20 1988 entitled Chemical Fabrics Corporation, North
21 Bennington, Vermont, Toxic Air Contaminant Impact Study,
22 right?

23 A. Yes.

24 Q. And it reflects on the cover page -- are you
25 with me on the cover page Dr. Hopke?

1 A. Yes.

2 Q. It's by the Vermont Agency of Natural
3 Resources, Department of Environmental Conservation, Air
4 Pollution Control Division?

5 A. Yes.

6 Q. And did you consider this report in
7 connection with your opinions in this case?

8 A. Again, I looked very quickly at it but did
9 not review it in great detail.

10 Q. And do you see on the very first page of the
11 summary it says, "the Vermont Agency of Natural
12 Resources, ANR, has been coordinating the testing of and
13 conducting evaluations of the gaseous emissions from the
14 Chemical Fabrics facility in North Bennington, Vermont."
15 Did I read that right?

16 A. That's right.

17 Q. You believe that to be true, right?

18 A. Yes.

19 (Hopke Exhibit 29, 2/1/88 letter,
20 Garabedian to Robert McWaters,
21 SGPPLVT13002583-584, marked for
22 identification, this date.)

23 Q. Then I've handed you Exhibit 29, Dr. Hopke
24 which is dated February 1st, 1988, so just shortly after
25 that report we just looked at that was dated

1 January 20th, 1988. And it's a letter from Harold
2 Garabedian, right?

3 A. Yes.

4 Q. To a Robert McWaters, right?

5 A. That's correct.

6 Q. And Mr. Garabedian states that he is
7 enclosing the final version of the agency's Toxic Air
8 Contaminant Impact Study regarding the Chemical Fabrics
9 Corporation in North Bennington, Vermont, right?

10 A. That's correct.

11 Q. Do you see in the middle of that first
12 paragraph there he says that "the conclusion of this
13 report is that the emissions from the facility do not
14 pose an undue threat to human health"?

15 A. That's correct.

16 Q. And do you see where he says, "the procedures
17 used in this report and the conclusion it draws have
18 been reviewed and endorsed by the Vermont Department of
19 Health"?

20 A. Yes.

21 Q. Do you see that?

22 A. Mm-hmm.

23 Q. Do you have any reason to believe that that
24 wasn't true?

25 A. That they believed that, yeah.

1 Q. I'm sorry, so let me ask it a different way.
2 You don't have any reason to dispute Vermont's belief as
3 reflected in this letter, correct?

4 A. Yes, I do.

5 Q. Do you think that --

6 A. They only looked at gases.

7 Q. Okay. Let me see if we can work through and
8 see if I can understand what you're saying. Do you
9 dispute that as of February 1st, 1988, Vermont's view
10 was that the report concluded that the emissions from
11 the facility do not pose an undue threat to human
12 health?

13 A. As far as they measured.

14 Q. Okay. Let's try to work through it and maybe
15 my question isn't clear. I'm really trying to see --

16 A. The point is the measurements were
17 redirected.

18 MR. DAVIS: Let him finish and then
19 answer.

20 Q. Let me finish the question and then you
21 should explain what your opinion is.

22 A. Sure.

23 Q. Let me ask it and see if we really can hone
24 in on what I'm trying to ask. Do you have any reason to
25 dispute that Mr. Garabedian was accurately conveying

1 what the State of Vermont believed as of February 1st,
2 1988?

3 A. No.

4 MR. DAVIS: Objection to the question.
5 I think it calls for speculation about what
6 the State believed.

7 Q. Do you think it calls for speculation to
8 attempt to opine on what an entity like the State of
9 Vermont believes?

10 A. Well, clearly Mr. Garabedian felt there was
11 no -- states that, clearly reflects that he did not see
12 a significant health effect from what was measured.

13 Q. Do you think it calls for speculation for you
14 to opine on what an entity like Saint-Gobain or ChemFab
15 believed decades ago?

16 A. Well, again, it depends on what people knew
17 beyond what was in fact measured.

18 Q. So that opinion would depend on what people
19 knew; was that your testimony?

20 A. Yes.

21 Q. In your teaching career and chemistry career,
22 I mean, have you ever held yourself out as an expert on
23 what people know?

24 A. No.

25 Q. Okay.

1 A. Only as far as is reflected in documents I
2 can read.

3 Q. And someone else could read them, too, right?

4 A. Correct.

5 Q. Like the jury in this case could read them,
6 right?

7 A. Absolutely.

8 Q. You state in your report, if we could go back
9 to your Merits Report on page 4, in the first full
10 paragraph, that "ChemFab apparently provided process
11 information and formulations information to the
12 consultants that performed emissions testing but did not
13 insist that the consultants test for the constituents of
14 the formulations." Do you see that?

15 A. Yes.

16 Q. What did you do to form that opinion,
17 Dr. Hopke?

18 A. Again, looking closely at the documents, the
19 charge to Environment One was again entirely on gaseous
20 emissions and so, therefore, it would neglect a
21 significant amount of some of the important other
22 emissions that might be important.

23 Q. Did you ever talk to anybody in -- at
24 Environment One to see --

25 A. No.

1 Q. -- to see anything?

2 A. No, just read what their charge was.

3 Q. From the document?

4 A. From the document.

5 Q. Do you know one way or the other if
6 Saint-Gobain or ChemFab ever provided actual samples of
7 its formulation to the State of Vermont?

8 A. I am not aware one way or the other.

9 Q. Do you know one way or the other if
10 formulation information was provided by Saint-Gobain or
11 ChemFab to Vermont?

12 A. I do not know.

13 Q. Want to take a quick break?

14 A. Sure.

15 THE VIDEOGRAPHER: The time off record
16 is 1524. We're off the record.

17 (Whereupon, a recess was then taken.)

18 THE VIDEOGRAPHER: We are on the record.
19 The time is approximately 1532. Please
20 continue.

21 BY MR. FLEMING:

22 Q. Thank you. Thank you, Dr. Hopke, again. Are
23 you ready to go?

24 A. Yeah.

25 Q. Great. So Dr. Hopke, if we could turn to

1 your Merits Report at page 4.

2 A. Okay.

3 Q. And about eight lines down, you see where it
4 says, "both Environment One and Alliance identified PFOA
5 as a constituent of the PTFE dispersion coated on the
6 fabric." Do you see that?

7 A. Mm-hmm.

8 Q. You cite a 1985 document there, right?

9 A. Yes.

10 Q. And one of the documents you cite, the 1985
11 document is actually authored by Environment One, right?

12 A. Yes.

13 Q. Are you aware that report was submitted to
14 the State of Vermont in 1985?

15 A. That's my understanding.

16 Q. So when a consultant identified PFOA as a
17 constituent in 1985, it was reported at that same time
18 to the State of Vermont, correct?

19 A. I don't know whether it was in their report
20 to the State because it -- it wasn't -- certainly wasn't
21 looked for in the stack emissions which was the primary
22 purpose of that report. I'd have to go back and read.

23 Q. As you sit here -- maybe I didn't ask it
24 correctly before. Maybe your answer is different or not
25 but do you know if that Environment One report that

1 identified PFOA as a constituent of the PTFE dispersion
2 was in fact provided to Vermont in 1985?

3 A. That's my understanding.

4 Q. That it was?

5 A. Because Vermont DEC or -- yeah, DEC came
6 back and said it was inadequate so they couldn't have
7 said it was inadequate if they hadn't seen it.

8 Q. Let's see if we could break that down. So
9 Environment One identified PFOA as a constituent in this
10 report in 1985 of a PTFE dispersion, right?

11 A. Right.

12 Q. And that report was provided to Vermont,
13 right?

14 A. Yes.

15 Q. After Vermont got that report, we've already
16 established, correct, that Vermont did not ask for PFOA
17 or APFO to be tested at any time, to your knowledge,
18 correct?

19 A. To my knowledge.

20 Q. To your knowledge before or after that time
21 you got that report in 1985 Vermont never regulated APFO
22 or PFOA as a hazardous substance, did it?

23 A. Not as far as I know.

24 Q. Or in any other way in Vermont, did it?

25 A. As far as I know.

1 Q. Dr. Hopke, you say in your report, it's in
2 the first paragraph if you want to take a look at it,
3 but my question is going to be a little more general
4 than that but you say in your report, you say you
5 evaluated what the company knew or should have known
6 about emissions of PFOA during the time it operated in
7 Bennington and North Bennington, right?

8 A. Yes.

9 Q. In terms of the methodology that you utilized
10 in this case to determine your view of what Saint-Gobain
11 or ChemFab knew or should have known, you reviewed
12 documents; is that correct?

13 A. That's correct.

14 Q. And the documents that you reviewed were
15 provided by Plaintiffs' counsel, right?

16 A. That's correct.

17 Q. You also reviewed some documents from the
18 Vermont website, right?

19 A. Yes.

20 Q. Did you review anything else to determine
21 what Saint-Gobain or ChemFab knew or should have known
22 about its emissions?

23 A. No.

24 Q. Have you ever done any kind of work for
25 anyone else where you tried to determine what a company

1 knew or should have known before?

2 A. No.

3 Q. So you've never used this method of getting
4 documents from Plaintiffs' attorneys, going to a Vermont
5 website to try to determine what a company knew or
6 should have known before?

7 A. No.

8 Q. Do you have any understanding of how
9 Plaintiffs' counsel selected the documents to provide to
10 you?

11 A. I do not know.

12 Q. Your Merits Report at page 4, Dr. Hopke,
13 second paragraph above number 3, first sentence, you
14 say, "ChemFab/Saint-Gobain never notified the Vermont
15 DEC of its likely emissions of PFOA despite information
16 about its toxicity provided by DuPont and 3M." Do you
17 see that?

18 A. Yes.

19 Q. We've already established that Vermont was
20 informed that PFOA was a constituent of a product
21 identified in the Environment One report in 1985, right?

22 A. That's correct.

23 Q. What's your basis for your opinion that
24 ChemFab/Saint Gobain never notified the Vermont DEC of
25 its likely emissions of PFOA?

1 A. There were earlier communications from
2 DuPont and 3M and I'd have to go back and look again as
3 to exactly when those were but there was something in
4 around '80 or '82 that started to suggest there might be
5 problems with PFOA and that didn't alert them to any
6 potential examination as to whether it might or might
7 not be a problem.

8 Q. Did you cite any documents in your Merits
9 Report provided by Dupont or 3M that in your view
10 discuss the likely emissions of PFOA using your words?

11 A. I don't -- I'm not sure whether that got
12 properly cited or not. I don't think I did.

13 Q. Am I right, Dr. Hopke, you don't cite a
14 single document sent from DuPont to ChemFab in your
15 report, do you?

16 A. No, and that's an omission.

17 Q. Okay. An omission on your part?

18 A. Yes.

19 Q. You don't cite a single document in your
20 report sent from 3M to ChemFab, right?

21 A. Right, an omission I'll have to correct once
22 I find the documents.

23 Q. When the Environment One report was submitted
24 to Vermont in 1985 reflecting forming your opinion as a
25 constituent, in your view should Vermont have known that

1 PFOA was likely being omitted?

2 A. No.

3 Q. When Saint-Gobain or ChemFab provided that
4 report -- I'm sorry, strike that.

5 When the Environment One report was submitted
6 in 1985, is it your view that ChemFab should have known
7 that PFOA was likely being emitted?

8 A. Yeah, based on the -- those prior
9 communications from DuPont and/or 3M but not on the
10 basis of measurements of EOCs.

11 Q. As you is sit here today, do you have any
12 information on whether DuPont or 3M provided information
13 to the State of Vermont back in 1985?

14 A. I'm unaware of any.

15 Q. You're not aware of any one way or the other,
16 right?

17 A. Right.

18 Q. Did you look to see what was provided to
19 Vermont by any other company at that time?

20 A. No, I had no mechanism for doing so.

21 Q. And your sole basis for concluding -- I'm
22 sorry, strike that. Your sole basis for asserting that
23 ChemFab should have known that product quality was a
24 likely emission in 1985 were 3M and DuPont documents
25 that you have not cited; that is right?

1 A. That's correct.

2 Q. If you turn to section 5 of your Merits
3 Report, Dr. Hopke --

4 A. Okay.

5 Q. -- the first sentence of section 5, do you
6 see it on page 6?

7 A. Mm-hmm.

8 Q. You write, "it would be unreasonable for a
9 company working with perfluorinated compounds and the
10 nature of the processes employed in the ChemFab
11 operations not to consider the virtual certainty of
12 emissions from PFOA." Do you see that?

13 A. Yes, I do.

14 Q. What standard of reasonableness did you apply
15 in writing that sentence?

16 A. Understanding the nature of the behavior of
17 these compounds when you heat them and the process of
18 the evaporation and potential sublimation that could
19 reasonably have been inferred by somebody who is
20 knowledgeable in the chemistry of these materials.

21 Q. And is your standard of reasonableness a
22 legal standard?

23 A. No.

24 MR. DAVIS: Objection to the question.

25 A. I can't make that judgment.

1 Q. Do you know if your standard of
2 reasonableness differs from what the law's standard for
3 reasonableness is?

4 MR. DAVIS: Objection.

5 A. I don't know; I'm not a lawyer.

6 Q. Do you think it could confuse the jury if
7 your standard of reasonableness were different from what
8 the law's standard of reasonableness is?

9 MR. DAVIS: Objection, calls for
10 speculation.

11 A. I don't know.

12 Q. Does your reasonableness standard take into
13 account what was known by other companies?

14 A. Yes.

15 Q. What was known by other companies?

16 A. What we know of in terms of the 3M and
17 DuPont memos.

18 Q. When -- what are you saying was known by
19 other companies; let's begin there?

20 A. That there was high likelihood of PFOA
21 emissions as reported by -- in those memos and I've got
22 to dig those memos out.

23 Q. When was it that --

24 A. Early '80s.

25 Q. And your basis for opining now not only on

1 what Saint-Gobain or ChemFab knew but also what 3M and
2 DuPont knew is what?

3 A. That they sent out these messages to
4 customers suggesting that these were potential things
5 that they needed to be aware of.

6 Q. As of what year would you say this was?

7 A. '80 to '82.

8 Q. This is based on documents provided to you by
9 Plaintiffs' counsel?

10 A. Yes.

11 Q. On your reasonableness standard, did you
12 consider whether a processor of materials containing
13 PFOA should have, under your reasonableness standard,
14 the same level of information that the suppliers or
15 manufacturers of those materials would have?

16 A. Yeah. I don't think that a processor would
17 necessarily have the same level but once they were
18 notified of it, then that should have identified the
19 potential for an issue.

20 Q. Under your reasonableness standard, would you
21 expect a processor to have the same information
22 reasonably as the supplier of the materials?

23 A. No.

24 Q. Under your reasonableness standard, correct?

25 A. Mm-hmm.

[illegible]

24 Q. At Section 4 of your Merits Report,
25 Dr. Hopke, which is on page 5, the second-to-last

1 paragraph, do you see where you wrote "there were
2 technologies available during ChemFab/Saint-Gobain's
3 operations in Bennington and North Bennington that would
4 have effectively removed PFOA from the process
5 emissions"?

6 A. Yes.

7 Q. Am I right that the two types of technologies
8 that you refer to in your Merits Report are wet
9 scrubbers and wet electrostatic precipitators?

10 A. That's correct.

11 Q. In your view, when did this technology become
12 available to ChemFab or Saint-Gobain?

13 A. Well before 1970. I mean, again described
14 in '76 textbook, wet precipitators go back to about 1911
15 with Catrol (ph).

16 Q. Did you do any kind of survey in any given
17 year to see if other companies similarly situated to
18 Saint-Gobain or ChemFab were utilizing that technology
19 at that time?

20 A. No.

21 Q. Do you have any idea whether it was then
22 state-of-the-art in the industry to use that technology
23 at that particular point in time?

24 A. It would not have been state-of-the-art to
25 use it to control smoke and so -- but it certainly would

1 have been to control the perfluorocarbon emissions
2 because that hadn't been considered as a problem at that
3 stage.

4 Q. So did you do a survey to see whether other
5 companies in fact were using that technology in any
6 given year?

7 A. No, I didn't do that but after the Clean Air
8 Act amendments of 1970, then a whole lot of companies
9 had to put in particle control technologies in order to
10 bring things into compliance with the TSP NAAEQS.

11 Q. As you sit here today, can you identify any
12 company that used those technologies to control
13 emissions for PFOA as of any given year?

14 A. No.

15 Q. How much -- what percentage of PFOA emissions
16 in your view would have been captured by this technology
17 that you described?

18 A. A good wet electrostatic precipitator should
19 be getting 95 to 98 percent of the particulate matter
20 mass.

21 Q. Can you cite to -- is that true of -- a piece
22 of technology like that that would have been available
23 when?

24 A. In that time frame.

25 Q. Can you cite to any document or scientific

1 literature that sets out that percentage?

2 A. I don't have them with me but I can find
3 them quick enough.

4 Q. Did you cite any in your report?

5 A. No.

6 Q. Did you state in your report any percentage
7 of PFOA that would be removed by the technology that
8 you're describing?

9 A. No.

10 Q. Dr. Hopke, switching gears a little, do you
11 agree that a mass balance analysis can be used to
12 identify and apportion sources of airborne particulate
13 matter in the atmosphere?

14 A. Yes.

15 Q. That kind of methodology has generally been
16 referred to within the air pollution research community
17 as receptor modeling, right?

18 A. Yes.

19 Q. Would you agree that a fundamental principle
20 of source or receptor relationships is that a mass
21 balance analysis can be used to identify and apportion
22 sources of airborne particulate matter in the
23 atmosphere?

24 A. Yes.

25 Q. Did you take any steps in this case to

1 investigate potential sources of PFOA air emissions
2 other than from ChemFab or Saint-Gobain?

3 A. No.

4 Q. You're aware that other industries within the
5 Bennington area have been considered by Barr Engineering
6 to be potential sources of airborne PFOA?

7 A. It was never made clear that they were
8 airborne and they were all potential. There's no
9 documentation to indicate the amounts and we have
10 limited data from the Vermont comments that, looking at
11 the Eveready plant found nothing so...

12 Q. Are you aware that the Vermont DEC in fact
13 publically stated that there are alternative sources of
14 PFOA within the Bennington area?

15 A. No.

16 Q. You're not aware of that?

17 A. Not aware of that.

18 Q. Do you have any doubt that there's PFOA or
19 APFO in the Bennington area from sources other than
20 Saint-Gobain?

21 A. It's possible.

22 Q. But you haven't assessed that to attempt to
23 identify those other sources, correct?

24 A. No.

25 Q. Correct?

1 A. Correct.

2 Q. Did you consider background or global
3 transport of emissions of PFOA or APFO in this case?

4 A. No.

5 Q. Tell me if this is correct. I've heard
6 someone say that you're known as the -- one of the
7 fathers of source apportionment; is that correct?

8 A. That's correct.

9 Q. And that's, again, attempting to determine
10 the source of a substance like PFOA or APFO in the
11 environment?

12 A. Based on the patterns of constituents.

13 Q. But that's not something you were asked to do
14 in this case?

15 A. That's correct.

16 MR. FLEMING: So maybe we could take a
17 break of five or ten minutes, regroup and
18 come back, okay?

19 THE VIDEOGRAPHER: Time is approximately
20 1555 and we are off the record.

21 (Discussion off the record.)

22 THE VIDEOGRAPHER: We are on the record.
23 Time is approximately 1608. Please continue.

24 MR. FLEMING: Thank you.

25

1 BY MR. FLEMING:

2 Q. Dr. Hopke, earlier in the deposition you
3 mentioned the concept of sublimation, right? Do you
4 recall that?

5 A. Yes.

6 Q. That's not mentioned in either your Merits or
7 your Class Certification Report, correct?

8 A. Correct. I found that information later.

9 Q. Today you found it or --

10 A. No, no, I found it --

11 Q. Okay. Is it mentioned -- am I right -- well,
12 let me ask, is it mentioned in Barton?

13 A. Yeah.

14 Q. Where?

15 A. I'd have to go back and look at it.

16 Q. I'd like you to do that.

17 A. I thought she mentioned sublimation. I'd
18 have to -- it's in the other book. That was page --
19 maybe I'm wrong.

20 Q. You had Barton when you drafted your Class
21 Certification and Merits Reports, right?

22 A. Right but -- no, I guess it doesn't.

23 Q. Is it mentioned in any of the Krusic papers?

24 A. No.

25 Q. I think earlier in the deposition you were

1 looking to see if you could find a cite to support any
2 assertion that all PFOA con -- you were looking for a
3 cite earlier today concerning any assertion that all
4 PFOA content would convert to PFOA by first sublimating
5 and then turning into PFOA. Do you remember that?

6 A. No, other way around.

7 Q. Explain it.

8 A. It has to convert to the -- as it sublimes,
9 it sublimes because it converts to PFOA and ammonia, and
10 I have to find that mechanistic paper.

11 Q. Okay. And you haven't found that --

12 A. No, I do not.

13 Q. -- today?

14 A. I don't think I have it with me.

15 Q. Okay. Can you describe any paper that says
16 that?

17 A. Yeah. I don't remember the author but I
18 have -- you know, I was reading it over the weekend
19 again so basically it's saying that at the surface of
20 the solid crystal you have the hydrogen ion is -- moves
21 from the ammonia to the PFO producing PFOA, which
22 sublimes as well as the ammonia.

23 Q. And that theory that you just described is
24 not stated in any of your reports, correct?

25 A. No, because this paper I found much more

1 recently.

2 Q. That was a change to the opinions that you
3 expressed in your report; is that correct?

4 A. It's just further support of the idea that
5 it would in fact be lost.

6 Q. The idea that you read about after you
7 submitted your reports is not expressed in your reports,
8 correct?

9 A. Sure.

10 Q. When was it that you first read this paper
11 that you seem to remember that gave you this idea?

12 A. About a week ago. I did another follow-up
13 search on this.

14 Q. You'll provide this paper that you're
15 describing to us?

16 A. Sure. As soon as I find it.

17 MR. DAVIS: He'll provide it to me;
18 we'll provide it to you.

19 A. I will track it down tonight.

20 MR. DAVIS: Would you mind sending an
21 e-mail or something in case I forget? I'll
22 try to remember.

23 MR. FLEMING: Sure. Between the three
24 of us -- I know Dr. Hopke will be looking for
25 it but sure.

1 BY MR. FLEMING:

2 Q. Dr. Hopke, in your career, how many times
3 would you say you've done source apportionment analyses?

4 A. Hundreds. Started in 1974. We got to have
5 more than 100 papers.

6 Q. Again, just so it's clear for the record,
7 that's not something you were asked to do here?

8 A. That's correct. I'm not aware of any data
9 that would be particularly useful for doing that.

10 Q. But you didn't look into that question
11 because no one asked you to do that; right?

12 A. Right. I had more than enough other things
13 to do.

14 Q. How much time did you spend preparing your
15 Class Certification Report in this case?

16 A. Something of the order of 35 hours.

17 Q. How about your Merits Report?

18 A. About five hours. No, it's got to -- no,
19 it's got to be more like 30 and 10. I know my total
20 hours were close to 40 and I tend to underestimate
21 hours. I'm bad that way. I would not be good at a
22 consulting firm.

23 Q. Dr. Hopke, do you believe -- strike that.
24 Let me start again, Dr. Hopke. Do you believe that
25 we've adequately covered all of the opinions that you

1 intend to offer in support of Class Certification in
2 this case?

3 A. For the most part. I mean, obviously there
4 were other things in there with regard to -- in both
5 reports that we didn't get into detail but I think
6 you've gotten the more major issues. I mean, the
7 biggest issue still comes down to emissions.

8 Q. Are there any opinions that you intend to
9 offer in support of Class Certification that are not
10 expressed in your report or that we did not discuss here
11 today?

12 A. Not that I know of.

13 Q. You would know -- it is your intent --

14 A. If there's more material coming in with the
15 deposition, then that might cause the need for a
16 revision but as far as what I know now, no.

17 Q. Right. That's all I can ask you is what your
18 intentions are as you sit here today. As you sit here
19 today, if we took your Class Certification Expert Report
20 and this deposition, would we have covered all of the
21 opinions that you intend to offer as of today in support
22 of Class Certification?

23 A. Yes.

24 Q. Same question for your Merits opinion --

25 A. Yes.

1 Q. -- is the same true? Now, you've indicated
2 some corrections that you would make and some additional
3 work that you may do at this deposition today, right?

4 A. Yes.

5 MR. FLEMING: We are going to leave open
6 the deposition, Gary, to the extent there's
7 further work done, further corrections made,
8 without prejudice to our rights to object to
9 any sort of out-of-time supplement, but if
10 such a supplement were permitted, we're going
11 to reserve the right to keep the deposition
12 open.

13 THE WITNESS: Sure. Okay.

14 MR. DAVIS: Subject to the rules.

15 MR. FLEMING: We're at 4:17. Give me
16 the indulgence of just five minutes. I don't
17 think that --

18 THE WITNESS: That would be fine. That
19 would be excellent. He'll have to sit there
20 and twiddle his thumbs at the airport.

21 MR. DAVIS: That's fine.

22 THE VIDEOGRAPHER: The time is 1617. We
23 are off the record.

24 (A recess was then taken.)

25 THE VIDEOGRAPHER: We are on the record.

1 The time is approximately 1621. Please
2 continue.

3 MR. FLEMING: Thank you very much,
4 Dr. Hopke. Subject to the comments I made
5 earlier, these are all of the questions that
6 we have as of this time.

7 THE WITNESS: Okay, good.

8 MR. DAVIS: I just have one follow-up
9 and it's going to be very short.

10

11 EXAMINATION BY MR. DAVIS:

12 Q. Dr. Hopke, you were asked about Exhibit 17,
13 which was a summary of the 1999 TRC Emission Testing
14 Report from the ChemFab plant. Do you recall that?

15 A. Yes.

16 MR. FLEMING: Forgive me for
17 interrupting but can I just try to find my
18 copy?

19 MR. DAVIS: Sure. You can have mine.

20 MR. FLEMING: That's awfully kind of
21 you.

22 MR. DAVIS: For the moment.

23 BY MR. DAVIS:

24 Q. I believe you were asked whether you had any
25 criticisms of the report and of course you weren't given

1 the whole report. You were given a summary but did you
2 actually address this in your Class Certification
3 Report?

4 MR. FLEMING: Objection, form.

5 A. Yes, I do.

6 Q. Where did you do that?

7 A. On page 5, Applicability and Accuracy of the
8 1999 Stack Test, three paragraphs.

9 Q. I'm not going to ask you to read those
10 opinions or even summarize them but it is in your
11 report?

12 A. Yes, it is.

13 Q. That's all.

14

15 EXAMINATION BY MR. FLEMING:

16 Q. Does your report, Dr. Hopke, provide any
17 basis to dispute that the particulate matter measured in
18 July 1999, the rate of emissions of it was lower with
19 the abater on as compared to when the abater was off?

20 A. Yes. No, it certainly would suggest that
21 that's the case but that was also the, the new tower and
22 designed to have better efficiency so it may not reflect
23 the performance of the existing abatements that operated
24 for most of the time period.

25 Q. So you don't know if this reflected the

1 performance of those other abaters one way or the other,
2 correct?

3 A. That's correct.

4 MR. FLEMING: I have no other
5 questions --

6 MR. DAVIS: Okay, that's fine.

7 MR. FLEMING: -- at this time. Thank
8 you.

9 THE VIDEOGRAPHER: This concludes
10 today's testimony given by Philip K. Hopke,
11 Ph.D. The total number of media units was
12 seven and will be retained by Veritext. The
13 time is approximately 1624. We are off the
14 record.

15 (4:24 p.m.)

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REPORTER'S CERTIFICATE

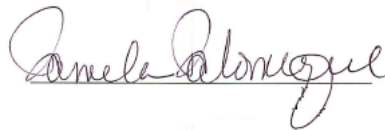
I, PAMELA PALOMEQUE, NYRCR, RPR, CRR, and
Notary Public, certify:

That the foregoing proceedings were taken before me
at the time and place therein set forth, at which time
the witness was put under oath by me;

That the testimony of the witness and all
objections made at the time of the examination were
recorded stenographically by me and were thereafter
transcribed;

That the foregoing is a true and correct transcript
of my shorthand notes so taken;

I further certify that I am not a relative or
employee of any attorney or of any of the parties nor
financially interested in the action.

A handwritten signature in cursive script, reading "Pamela Palomeque", written over a horizontal line.

PAMELA PALOMEQUE, NYRCR, RPR, CRR
Notary Public

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Federal Rules of Civil Procedure

Rule 30

(e) Review By the Witness; Changes.

(1) Review; Statement of Changes. On request by the deponent or a party before the deposition is completed, the deponent must be allowed 30 days after being notified by the officer that the transcript or recording is available in which:

(A) to review the transcript or recording; and

(B) if there are changes in form or substance, to sign a statement listing the changes and the reasons for making them.

(2) Changes Indicated in the Officer's Certificate. The officer must note in the certificate prescribed by Rule 30(f)(1) whether a review was requested and, if so, must attach any changes the deponent makes during the 30-day period.

DISCLAIMER: THE FOREGOING FEDERAL PROCEDURE RULES ARE PROVIDED FOR INFORMATIONAL PURPOSES ONLY. THE ABOVE RULES ARE CURRENT AS OF SEPTEMBER 1, 2016. PLEASE REFER TO THE APPLICABLE FEDERAL RULES OF CIVIL PROCEDURE FOR UP-TO-DATE INFORMATION.

VERITEXT LEGAL SOLUTIONS
COMPANY CERTIFICATE AND DISCLOSURE STATEMENT

Veritext Legal Solutions represents that the foregoing transcript is a true, correct and complete transcript of the colloquies, questions and answers as submitted by the court reporter. Veritext Legal Solutions further represents that the attached exhibits, if any, are true, correct and complete documents as submitted by the court reporter and/or attorneys in relation to this deposition and that the documents were processed in accordance with our litigation support and production standards.

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